SEPTEMBER 1958

CHEMICAL PROCESSING

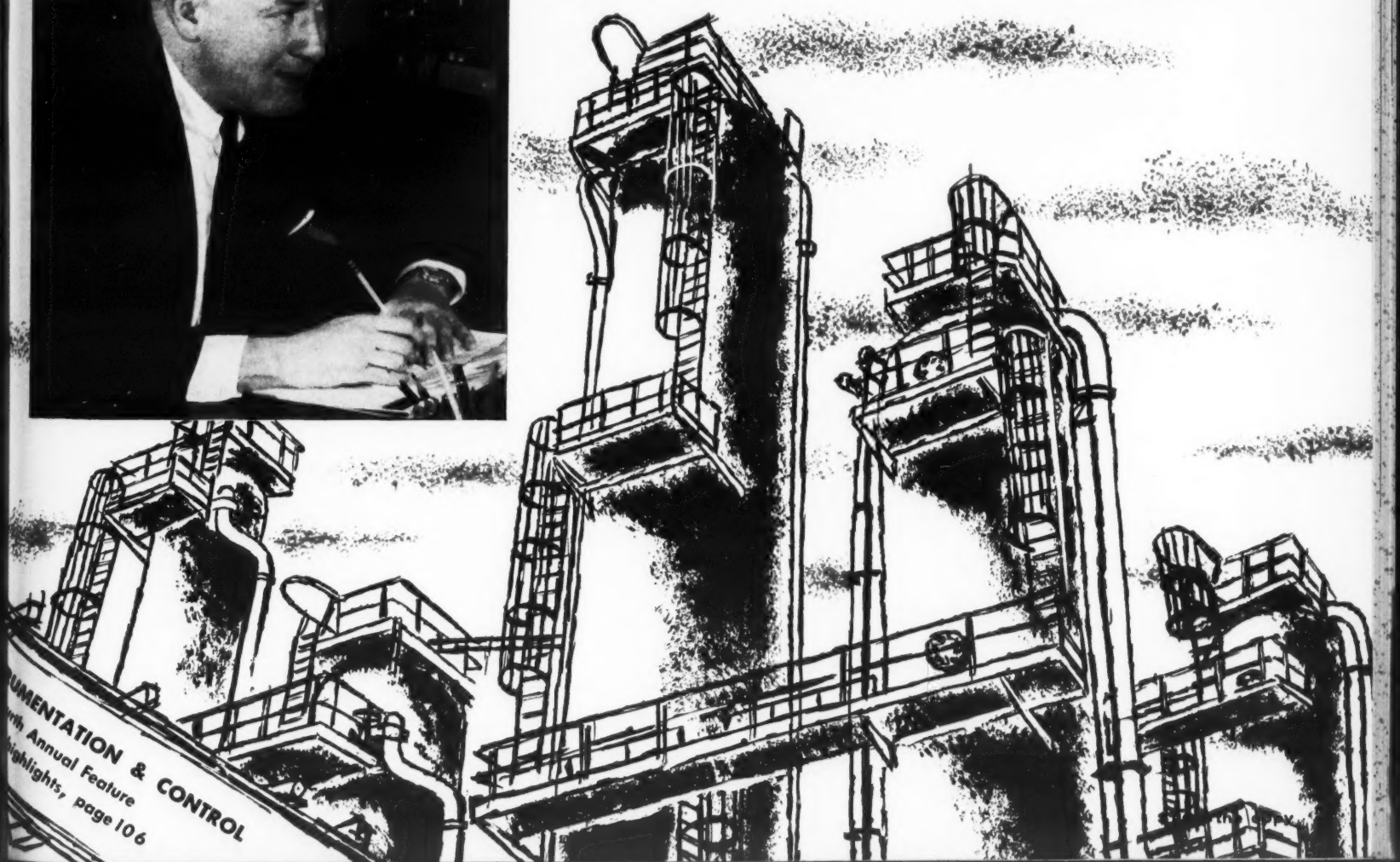
Electromet's giant titanium plant uses sodium safely by the ton 76

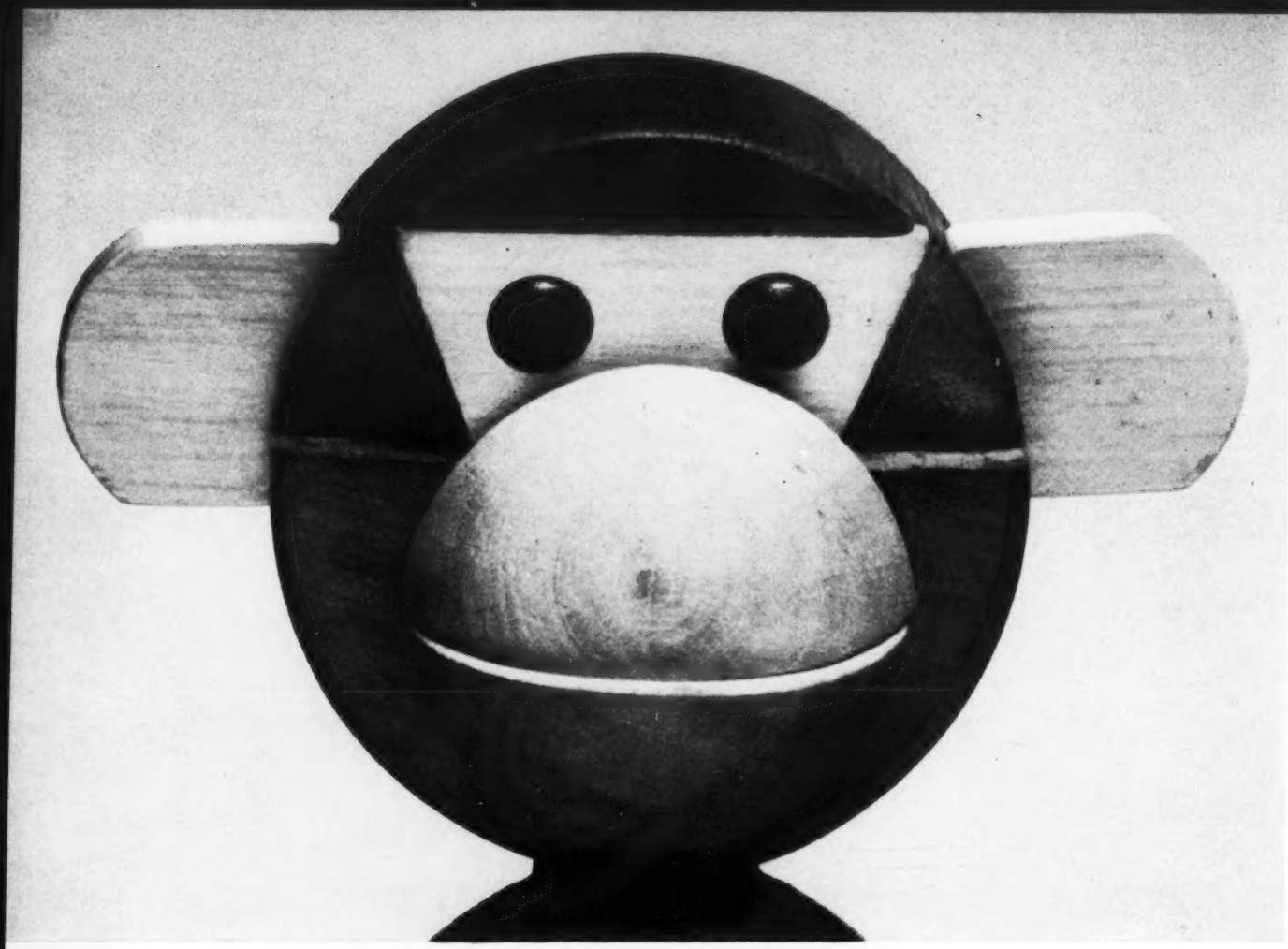
Continuous, fast silica gel process makes variety of grades 144

. . . also more than 200 terse reports on new processing techniques, chemicals, instruments, equipment 6

WYANDOTTE BUILDS 'NEW PERSONALITY' WITH GEISMAR

President Robert Semple . . . His company becomes stronger contender in chemical and petrochemical 'big leagues' . . . . . page 29





Why monkey around making your own fluorine gas?

...When all you have to do is pick up the phone and order it from General Chemical! Why "do it yourself"– with all the labor, expense and hazard involved–when *fluorine gas in cylinders* is so readily available!

As a pioneer in production of fluorine and fluorine-based chemicals, we are geared to supply your fluorine gas requirements in both research and commercial quantities. And if your organization is conducting large scale development work, you will want to investigate the availability of fluorine *as a liquid in bulk* from General. Developing the method of shipping and handling tank-truck tonnages of fluorine in liquid form–like many other advances with this highly reactive material – is a result of General Chemical research.

In the field of fluorine chemistry, General Chemical has earned recognition as the leader. In experience. In range of products. In manufacturing ability and versatility. In advanced research. These are all at your service. For further information on fluorine–gas or liquid–contact the nearest office listed below. Write for our comprehensive 21-page technical bulletin "Fluorine."

BAKER & ADAMSON®
Fine Chemicals

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cleveland (Miss.) • Cleveland (Ohio) • Denver Detroit • Houston • Jacksonville • Kalamazoo • Los Angeles • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • Portland (Ore.) • Providence San Francisco • St. Louis • Seattle • Kennewick, Vancouver and Yakima (Wash.)

DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations.

They have been sent to us by our many readers.

Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.
Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 85.

For more information on product at left, specify 1000 see information request blank opposite last page.

that's interesting

Thought-provoking slants on projects and products

In small packages

There is more than one way to skin a cat — or clean a pipe. At the Detroit works of the Aluminum Company of America, sand began showing up in compressors. Faced

"Hey Joe, the pipe inspector's here."

with digging up 18- and 24-inch air intake lines, Alcoans learned of the Midget Service Company, which specalizes in providing men capable of fitting into small spaces. The man hired to do the job easily traversed the entire length of the lines, located the leaking joints, and repaired them from the inside. Since then, regular inspections have been made the same way. (*The Alcoa News*, Aluminum Company of America)

From whence 'barn'?

When is a barn not a barn? In the case of nuclear science, when it is used as a unit of measure for the area presented by the nucleus of an atom to an incident particle (10^{-24} square centimeters).

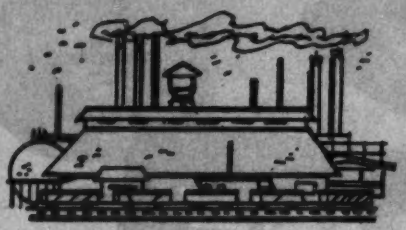
Dr. Lowell Bollinger of Argonne National Laboratory has tracked the origin of the term to a team of scientists working at Purdue University on nuclear cross sections early in 1943. Since the "side of a barn" was a well-established target area, the men began using the "barn" in their work and were surprised to find that it was an established term in scientific circles by autumn of 1943.

FLOWLINE®
WELDING FITTINGS
Stainless Steels · Monel · Nickel · Aluminum
5677 Stock Items
You can plan for economical, efficient, butt-welded corrosion-resistant piping with assurance of quick availability of FLOWLINE fittings. Delivery can be made from stock by leading distributors. Made in sizes ½" through 24"— Schedules 5S through 160 — Stainless Types 304, 304L, 316, 316L, 347; Monel, Nickel, Aluminum. Seamless fittings with all the plus values . . . at no extra cost.
FLOWLINE CORP.
World's Largest Manufacturer of Stainless Welding Fittings
NEW CASTLE, PENNSYLVANIA
FORMERLY "WELDING FITTINGS CORP."
233 BROADWAY, NEW YORK 7, N.Y.
4781 EAST THIRD STREET, LOS ANGELES 22, CALIF.
Remember FLOWLINE® WELDING FITTINGS
Forget CORROSION PIPING PROBLEMS
F-3

Check 1001 opposite last page

From Process Circuits to Waste Water Disposal

Verti-Line



CUTS PUMPING COSTS

LESS SPACE
Verti-Line pumps occupy as little as 1/5 the space of ordinary horizontal pumps of similar capacity.

GREATER EFFICIENCY
Pumping efficiencies ranging to 90% mean you get maximum output with minimum power input.

LOWER MAINTENANCE COSTS
Carefully kept records prove that for over 40 years, negligible maintenance costs are the rule with Verti-Line.

NO PRIMING
Operating overhead is cut because submerged pumping element eliminates priming.

COMPLETE LINE
Verti-Line pumps range from 20 to 35,000 gpm, 1½ to 1000 H.P., and handle both corrosive and non-corrosive fluids.
Write for Bulletin 1100

Verti-Line Pumps are exclusive products of

LAYNE & BOWLER PUMP COMPANY
general offices & main plant
2943 VAIL AVENUE • LOS ANGELES 22, CALIFORNIA

Check 1002 opposite last page

CHEMICAL PROCESSING

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

More than 50,000 copies of this issue

Vol. 21 September 1958 No. 9

©Putman Publishing Company 1958

Published Monthly by

PUTMAN PUBLISHING COMPANY
111 East Delaware Place
Chicago 11, Illinois
Telephone: WHitehall 4-6141

also publishers of FOOD PROCESSING, FOOD BUSINESS, POWER INDUSTRY

Russell L. Putman	President and Publisher
Ewing W. Graham	Vice President and Treasurer
Nathaniel Beck, Jr.	Vice President
Kenneth S. Kaull	Vice President
George W. N. Riddle	Director of Research and Development
Roy G. Helsing	Production Manager
Thomas J. Scanlon	Director of Circulation
Robert C. McKay	Circulation Manager

Editorial Staff—page 6
Advertising Representatives—page 233

CHEMICAL PROCESSING serves members of the Management Team in these industries:

Basic Chemical and Chemical Processing Industries

Industrial inorganic & organic chemicals (acids, alkalis, plastics, synthetic fibers, explosives, etc.)
Drugs & medicines
Soap & cleansing products
Paints, varnishes, lacquers
Gum & wood chemicals (Naval stores)
Fertilizers
Animal & vegetable oils & fats
Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.)
Paper & allied products
Petroleum, coal, coke-oven products
Rubber products
Stone, clay & glass products
Atomic energy establishments

Other industries utilizing chemicals or chemical processes

Food and allied products
Textile dyeing & finishing
Leather tanning & finishing
Metals & alloys
Machinery & equipment
Allied products (tobacco, photographic film, instruments, fabricated plastic products, etc.)
Water treating & purification plants
Government (including ordnance, missiles, etc.)

Specialized services to the chemical processing field

Plant construction consulting firms
Independent research & testing laboratories
Manufacturers of specialized chemical equipment

Subscriptions

QUALIFIED-READER SUBSCRIPTIONS are accepted from selected management and technical key men in the chemical industries without charge. To apply for a qualified-reader subscription fill in and mail the request-qualification form opposite last page.

OTHER SUBSCRIPTIONS — from "non-qualified" persons (those who are not key processing men in the chemical industries) — are accepted at $1.00 the copy, or $10.00 the year. Such subscriptions are not counted as "industry circulation" on BPA audit reports.

Accepted as Controlled Circulation publication at Mendota, Illinois. Publication office: 1501 W. Washington Road, Mendota, Illinois. Address all correspondence to Editorial and Executive office, 111 East Delaware Place, Chicago 11, Illinois.

Member
National Business Publications, Inc.
Business Publications Audit
of Circulation, Inc.

Whipping Obsolescence

Interestingly enough, a survey made by CHEMICAL PROCESSING on problems of instrumentating a new chemical processing plant, or process, (see page 107) found that the most difficult problem encountered was securing cooperation among all the groups involved.

And that if this wasn't attained, the instrumentation project could easily be obsolete by the time it went into operation.

Almost without exception the letters emphasized this point: That strong liaison efforts are needed. That project "champions" — enthusiastic leaders to supply strong liaison — should be selected.

Some companies say these projects leaders should be chosen from operating people who will have the final responsibility for the plant or process.

Why? A man who is going to have to live with the chemical processing plant and answer for its manufacturing costs is bound to take a greater interest in proper construction of the plant, was the reply.

Other companies suggest that professional motivation and interest can be sufficient to cause the individual engineer to become enthusiastic . . . developing the desire to cooperate to a high degree.

Whether whipping obsolescence of instrumentation is your problem or not, you will be interested in the comments of the design and instrument engineers, production and operating men quoted in the article. After you have read it, send us your comments. We are interested in your suggestions, too.

William C. Clarke

Assistant Editor

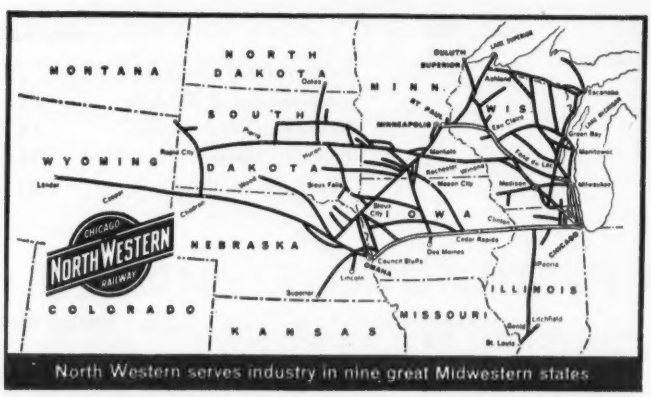
GUESS WHO

threw the overalls in the plant site chowder?

Not sweet, lovable Susie Q.? Well, not exactly. It all happened when Susie's Dad was appointed manager of a new plant. Then when Mrs. Q. asked where Susie would go to school, Mr. Q. said he *thought* the nearest school was eight miles away. Down went Mrs. Q.'s foot. Loss to the new plant: one brilliant manager.

Basic trouble here was, company management, busy with construction plans, neglected "minor" details such as schools, churches, shopping facilities, home availability and community reception of the new plant.

It's an example of the many considerations in the selection of the "right" plant site. One sure way of reducing the factor of oversight is to consult with North Western's Industrial Development Department *before* selecting a location. Accurate, up-to-date information on plant sites is our business. Experts in many fields, such as legal, marketing, labor, public relations, engineering and transportation furnish detailed, authoritative facts on the best sites in nine states. Why not use North Western service . . . there is no obligation!



North Western serves industry in nine great Midwestern states

Address: GENE F. CERMAK
Director of Industrial Development
Chicago and North Western Railway
400 W. Madison Street
Chicago 6, Illinois

CHICAGO AND NORTH WESTERN RAILWAY

Check 1003 opposite last page

highlights

CHEMICAL PROCESSING

SEPTEMBER 1958

VOLUME 21 • NUMBER 9

CHEMICAL BUSINESS

CONTROVERSY: Should 'Non-profit Research' Be Taxed?
Yes, If *Applied* Research, says L. E. Harris 27
Tax Would Throttle Progress, says C. C. Furnas 28

Wyandotte Builds 'New Personality' with Geismar Plant 29
Contract Maintenance Cuts Costs, Part 2 — Alan McCone 30
Solving Research Problems of Small Business — H. K. Work ... 31
Shale Oil — Coming Source of Energy — F. L. Hartley 32
Puerto Rico — Good Place to Locate a Chemical Plant 36
Pipelines Aid Industrial Development — W. T. Kopp 42

NEW PROCESSING TECHNIQUES, MATERIALS and EQUIPMENT

U. S. and WORLD PETROCHEMICALS

Direct-oxidation ethylene oxide process has high efficiency 51
Coal-based activated carbon boosts butadiene production 56

NEW SOLUTIONS OF PROCESSING PROBLEMS

Recovers 98% of phenol from ammonia waste liquor 70
Electromet handles tons of sodium safely in titanium plant 76

CHEMICAL MATERIALS

Fluoroalcohols provide thermal and chemical stability 91
Naphthalene sulfonic acid condensate valuable as dispersant .. 96

PROCESS INSTRUMENTATION — Fourth Annual Feature

Thirty-eight pages of latest techniques and equipment for plant control, lab testing — Section highlights on 106

IDEAS

Silica gel by continuous process 144
Filter testing center duplicates full-scale plant conditions 152

MATERIAL HANDLING AND PACKAGING

Halves manpower needed for banbury charging 155
Doubles filling rate for screw-top cans 160

CORROSION CONTROL

Chemical stops fouling and corrosion 168

PROCESSING EQUIPMENT

Chlorine recovery system pays out in a year 178

PLANT ENGINEERING, MAINTENANCE & SAFETY

Safety in the age of automation 188
Couplings speed solvent transfer, make hose handling safer ... 195

THE STAFF

Editor
John C. Vaaler

Managing Editor
Dana B. Berg

Consulting Editor
D. S. Davis

Petrochemical Editor
Gordon Weyermuller

Washington News
Joan Marziotti

Associate Editor
Ted F. Meinhold

Assistant Editors
William C. Clarke
Theodore W. Wett
John C. Steevens

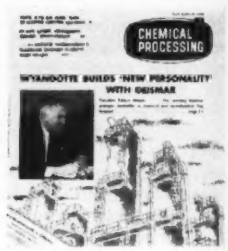
Editorial Production
Joann Schmitt
Babette Bernhardt

Art Director
Ralph C. Donges

Editorial Assistants
Helen Winton
Stephanie Imbros
Janice C. Markley
Carol Davis

THIS MONTH'S COVER

A portion of Wyandotte's new Geismar (La.) ethylene oxide plant is depicted behind president Robert Semple on the cover. The "CB Profile" on page 29 takes a look at Wyandotte's "new personality." Geismar plant and process are described on page 71.



REGULAR FEATURES

Letters from Readers	7	Engineering Data	85
Conventions & Exhibits	12	Recent Books	202
Watching Washington	14	New Literature	210
Nuclear Notes	18	Advertisers Index	231
Spotlight on People	23	Sales Representatives	233

SPECIAL READER SERVICES

• For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page

• To subscribe to this magazine, see reader-qualification form opposite last page

The individual and the team

Gentlemen:

I have read, with considerable interest, Dr. Kroll's thought-provoking article "Individual vs. Team Research" published in your June 1958 issue (Page 29).

I am sympathetic with his main concern. It does seem increasingly difficult for the individualistic, unorthodox, creative thinker to operate effectively in research establishments. It occurs to me, however, that Dr. Kroll's emphasis of individual versus team research tends to obscure the real issue.

The problem is not confined to the alternatives of individual versus group performance as such. It is substantially more fundamental and challenging. Actually, it involves fostering that leadership that will integrate the contributions of many diverse talents without sacrificing the advantages of individuality.

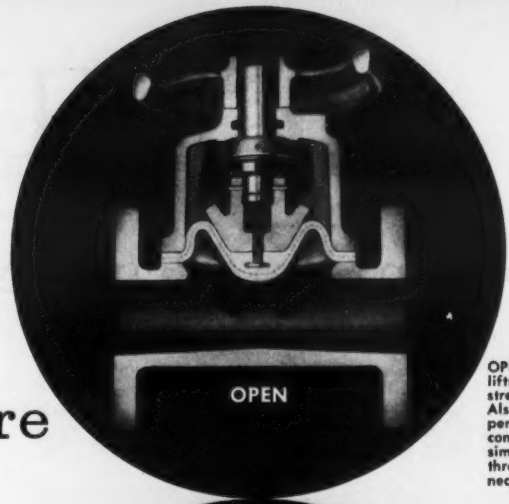
As a technique for discovery, team research does not necessarily mean mass control of thinking, with individual identities suffocated under a blanket of conformist mediocrity. Team research might better be considered as a collaborative approach to a problem. The individual members concerned are assigned roles most compatible with their personal preferences, aptitudes, and personalities.

Loss of preservation of identity in such a collective action depends largely upon the quality of leadership, and a corporate environment conducive to the development and support of such leadership. Therefore, we need administrators who can develop effective group effort without violating the mechanism of creativity.

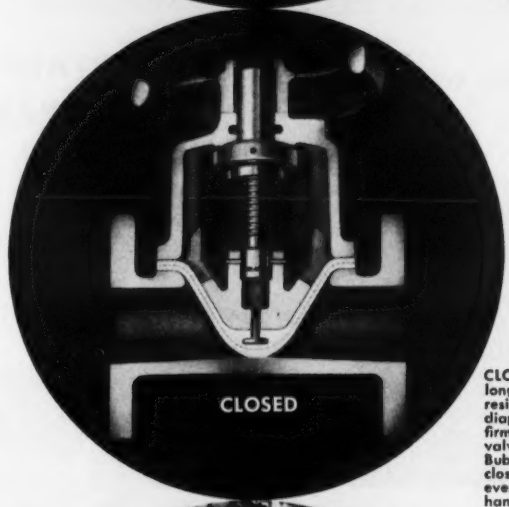
There is general agreement that it requires a high degree of skill to administer a research program effectively. It means channeling the talents of the unorthodox and at the same time utilizing the capabilities of the conformist.

Let us not, therefore, dodge

Maximum flow, minimum turbulence, negligible pressure drop!



OPEN Diaphragm lifts high for streamline flow. Also, valve design permits comparatively simple rodding through, when necessary.



CLOSED Despite long usage, resilient diaphragm seals firmly against valve body. Bubble-tight closure is assured, even when handling gritty or fibrous materials.

GRINNELL-SAUNDERS STRAIGHTWAY DIAPHRAGM VALVES* are unsurpassed for handling viscous materials — semifluid foods, latex, magmas; solids in suspension — slurries, pulp stock, sludges; fluid-borne abrasives; corrosive chemicals.

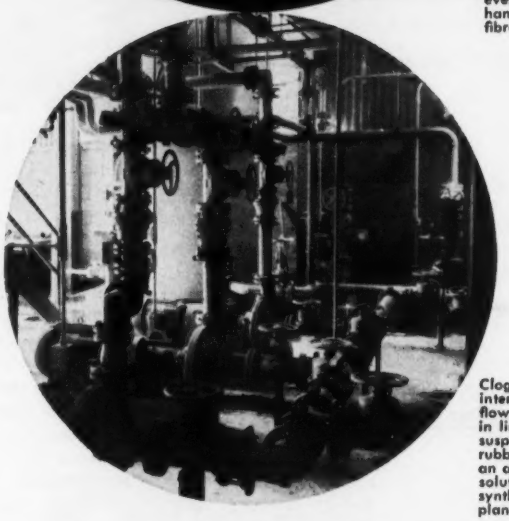
The straight-through design eliminates pockets, gate trenches and other obstructions which can trap solids. The result is maximum flow, minimum turbulence, and negligible pressure drop for a diaphragm valve.

The straight-through design also has the advantage of causing very little basic change in the direction of the fluid stream, thus reducing abrasive action from high velocity particles.

These advantages are in addition, of course, to benefits normally associated with the use of diaphragm valves . . . such as freedom from corrosion and clogging of working parts, since these are completely sealed off by the diaphragm; prevention of product contamination; elimination of stem leakage and routine maintenance, because there are no packing glands. Also, when properly pitched, lines are self-draining.

Grinnell-Saunders Straightway Diaphragm Valves are available in a choice of body sizes and materials, linings and diaphragms. Handwheel or power operated. For complete information, write Grinnell Company, Inc., 277 West Exchange St., Prov. 1, R. I.

*Patented



Clogging and interruption to flow is prevented in lines handling a suspension of rubber particles in an acid brine solution at this synthetic rubber plant.

GRINNELL-SAUNDERS DIAPHRAGM VALVES

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

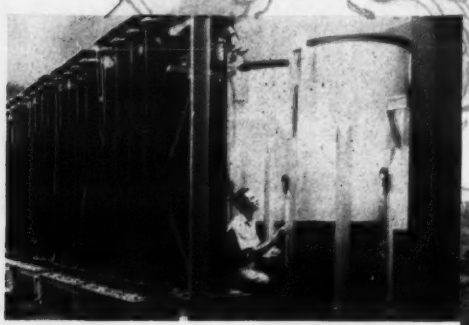
pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

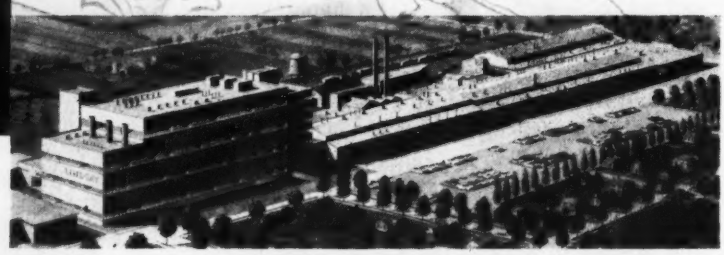
Check 1004 opposite last page

LINDSAY

Thorium, Rare Earth & Yttrium Chemicals

IMPORTANT ADDITIONS TO TRONA'S* CAPABILITIES AND SERVICE





The merger on May 1, 1958, of Lindsay Chemical Company into American Potash & Chemical Corporation joined two pioneering names already in the forefront of new chemical technology. Lindsay is the largest known producer of thorium, rare earth, and yttrium chemicals. Their greatly expanded production facilities have made these materials available at *dramatically reduced* prices in gram to carload quantities. The enormous potential of Lindsay's products – with applications in carbon arc lighting, reactor control materials, optical products, glass, textiles, paints, high temperature alloys, and many other areas – reflects American Potash & Chemical Corporation's traditional policy of expanding its service to Industry. Lindsay's products supplement AP&CC's lithium, boron, cesium, rubidium, and other new chemicals now available. Years of accumulated experience by the Lindsay division's technical staff is at your service. Let us show you how this experience can aid you in your process or new product development. *Address inquiries to:* LINDSAY CHEMICAL DIVISION, American Potash & Chemical Corporation, West Chicago, Illinois.

TRONA

American Potash & Chemical Corporation

3000 WEST SIXTH STREET, LOS ANGELES 54, CALIFORNIA
99 PARK AVENUE, NEW YORK 16, NEW YORK

SALES OFFICES: LOS ANGELES, NEW YORK, CHICAGO, SAN FRANCISCO, PORTLAND (ORE.), ATLANTA, COLUMBUS (OHIO), SHREVEPORT

*Tradename and trademark AP&CC

LANTHANUM • RARE EARTH CHLORIDES • CERIUM OXIDE • THORIUM • DIDYMIUM • YTTRIUM

Check 1005 opposite last page

the issue by condemning team research as such. What we must do is understand and develop these skills of enlightened management under which each person can best serve the purpose of research. Surely we have need and room for the coordinated contributions of all members of an organization. I submit that to accept this challenge would be more constructive than to label team research as inherently incompatible with the best interests of the uncommon man. I know from personal experience that this is a realistic and attainable goal.

E. M. KIPP
Foote Mineral Co.
Berwyn, Penna.

Says Kipp misses point

Dear Mr. Vaaler:

As to Mr. E. M. Kipp's objections, there is no basic disagreement on my side . . . I would be sorry if I had conferred the idea that I condemn team research as such but I certainly defined its limitations and the places where it fits. I stressed the difficulties facing the manager of a project who has to assemble his team from individuals with usually diverging traits.

I agree with Mr. Kipp that emphasis should be put on leadership within a team, but before this expression is used its content should be analyzed. This I also tried to do with care so as not to arouse susceptibilities.

It would be a rewarding task for a psychologist to examine the mental attitude of team leaders and to see how they create "esprit de corps". To better understand the issue we may go to the extremes: Will the brainy individualist of the masochist and introverted type perform well under or with a sadist, aggressive, extrovert leader with limited knowledge?

In this case a conformist team and a soft leader would certainly be preferable to the explosive mixture of psychologically incompatible types of human beings, condemned to

work together. To stress leadership, as does Mr. Kipp without analyzing the required character traits is therefore missing the main point.

Success in community work can be achieved only by working with people, not against them, and this means consent. Failure or success in collective research depends on this.

W. J. KROLL

Corvallis, Oregon

Agrees with Kroll

Dear Sir:

Dr. Kroll's address is full of statements worth while saying and I can agree with most of them.

A point not mentioned is the legend that young scientists in general are more inventive than older scientists. Dr. Kroll seems to be an example of the opposite.

A good practical knowledge of at least one industrial field is of prime importance in exploring and developing new chemicals and processes.

Too many able chemists who have acquired that practical knowledge are shifted into administrative jobs and after that never more will contribute anything of scientific value. Very likely they prefer administration above team research.

The lone inventor frequently is leading an exciting life with many rewards besides the financial results of his work.

It is doubtful whether much assistance can be given to this group of individualists, or whether such would be desirable, because their methods of working and their achievments are as varied as their personalities.

However it would be recommendable that official agencies as the National Science Foundation would give favorable consideration to proposals for research projects from independent scientists.

J. RINSE

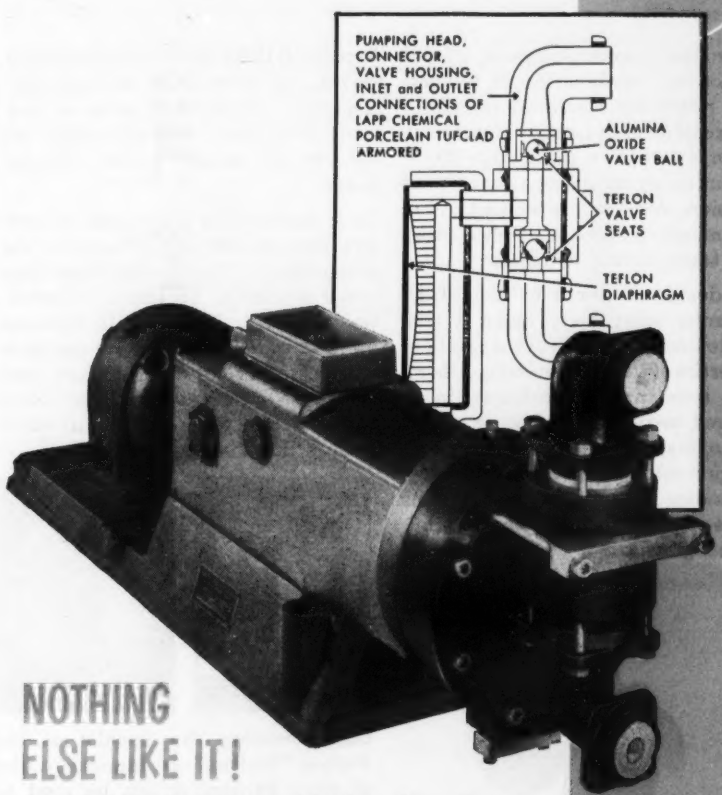
Chemical Research Associates
Bernardsville, N. J.

You Can Pump in controlled volume

HYDROCHLORIC ACID... all concentrations
CHLORINATED HYDROCARBONS
CORROSIVE METALLIC SALT SOLUTIONS
DILUTE ACIDS
MIXED ACIDS
WITH

Lapp PULSAFEEDER

COMPLETELY NON-METALLIC CONSTRUCTION
AND
NO STUFFING BOX TO LEAK


PUMPING HEAD, CONNECTOR, VALVE HOUSING, INLET and OUTLET CONNECTIONS OF LAPP CHEMICAL PORCELAIN TUFCLAD ARMORED
ALUMINA OXIDE VALVE BALL
TEFLON VALVE SEATS
TEFLON DIAPHRAGM

Solid Lapp Chemical Porcelain, combined with parts of alumina ceramic and Teflon plastic, is used for the liquid end of this model of Lapp Pulsafeeder. All parts which can come in contact with liquid being pumped are non-metallic, chemically inert. Thus, positive-displacement metered pumping of "hard-to-handle" corrosive chemicals is made certain and permanently trouble-free.

WRITE FOR BULLETIN 440
with typical applications, flow charts, description and specifications of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 3502 Poplar St., Le Roy, N. Y.

NOTHING ELSE LIKE IT!

Lapp Pulsafeeder is the combination piston-diaphragm pump for controlled-volume pumping of fluids. Reciprocating piston action provides positive displacement. But the piston pumps only an hydraulic medium, working against a diaphragm. A floating, balanced partition, the diaphragm isolates chemical being pumped from working pump parts—eliminates need for stuffing box or running seal. Pumping speed is constant; variable flow results from variation in piston-stroke length—controlled by manual hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

Lapp

Check 1006 opposite last page

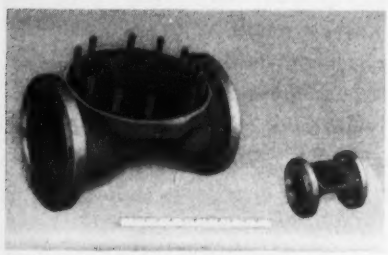
Now Penton's* Miracle Characteristics are put to use in Diaphragm Valves!

Hills-McCanna's Exclusive New Lining Meets Many of the Service Requirements That Once Called For Stainless Steel and Glass!

By: R. McFarland,
Technical Director,
Hills-McCanna Company

Here at Hills-McCanna an exhaustive search has paid off: a new lining material for diaphragm valves matches the economies of rubber lining while meeting many of the service requirements of glass lining and stainless steel.

A new Penton plastic-lined valve body (pictured below) has been developed, tested and readied for the specialized needs of the processing industries.



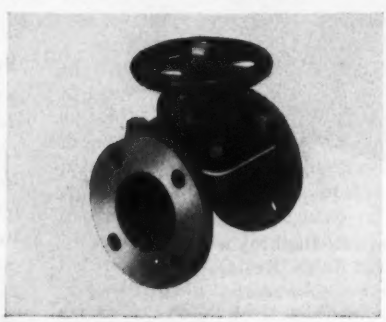
A six inch and three quarter inch Penton lined valve body

Because of its wide versatility, we believe a brief rundown on the new product's unusual characteristics and its ability to cope with diverse chemical service applications will be of interest to you.

Economically, the Penton plastic-lined valve stands alone. Competitively priced with rubber-lined valves, it meets every requirement placed on the hard rubber-lined types. This versatile valve has the ability to meet many of the service requirements that once called for the higher-priced stainless steel and glass-lined valves.

Performance-wise, Penton (a chlorinated polyether polymer), a product of Hercules Powder Company, affords an excellent combination of temperature resistance, chemical resistance and exceptional dimensional stability. *Penton is durable:* it takes up to 300°F without losing its ability to withstand corrosion. Also, it is absolutely non-contaminating; cannot affect a product's taste, aroma or color.

The design features of the Hills-McCanna valve body make it possible to take advantage of the excellent properties of the Penton lining. Chemically resistant Penton lining, in an armored body of cast iron or aluminum, offers the most universally adaptable processing valve available today. It handles *more* substances . . . and works equally well with metallic, plastic, glass and lined piping.



Above is a complete handwheel operated Diaphragm Valve with Penton lined body

Penton lined diaphragm valves are available in sizes ½" thru 6" with flanged ends, and diaphragm valves with solid Penton bodies are available in sizes ½" thru 2" with screwed ends.

As with all Hills-McCanna diaphragm valves, the valve is of packless construction. Its working parts are isolated from flow, and are easily accessible for simple in-line maintenance.

To introduce this valve—and to give you the opportunity of noting the properties of Penton—we have prepared a concise Technical Information Bulletin, No. 114. It contains more than 250 of the more common chemical services, temperature and pressure specifications, and elaborates on the typical services in which Penton lined valves can be used.

Supplementing the booklet is the Penton "Dollar." An immersion disc of solid Penton, it can be used to demonstrate its unusual chemical and temperature resistance characteristics. Let the Penton "Dollar" show you how you can save dollars with the use of Hills-McCanna Penton lined valves in your plant. Both Bulletin and "Dollar" are available via letterhead request. Write: *Hills-McCanna Company, 4571 W. Touhy Avenue, Chicago 46, Illinois.*

*Penton is a registered trade name of Hercules Powder Company

Check 1007 opposite last page

LETTERS

Deterrent to education

Gentlemen:

I congratulate you for the two excellent articles about education in your May issue (pages 44 and 46) and I wholeheartedly agree with the opinions expressed by Prof. Urey and Admiral Rickover.

In my opinion there are two more things which tend to decrease interest in further education, be it physical sciences or humanistics: a) The interest and natural curiosity of small children to find out how and why things happen is systematically killed by grown-ups who don't want to think in order to give a satisfactory logical answer; they just say: "Because!". This conditions our youngsters to accept things without understanding them. b) All the "gingerbread" connected with graduation from grade school and high school (as well as the name "High" school for something which is only secondary or even elementary) gives those involved an unjustified, proud feeling of accomplishment and satisfaction which makes it seem unnecessary to continue learning: "After all, we are graduates now and know all that's necessary, that's what everybody tells us." Youngsters do not realize that graduation from secondary school is only the fundamental base upon which the building of knowledge and wisdom can be built.

RALPH SCOTONI JR.
Circleville, Ohio

Taxes and survival

Gentlemen:

Your magazine and Mr. Moffit deserve credit for bringing to the attention of the readers a plan for permitting the medium sized firm to grow and, in some cases, to *survive* (A New Tax Plan, April CHEMICAL PROCESSING, page 39).

Under our present tax laws and banking practices a medium sized firm has a rough time acquiring capital for new

plant expansion in the chemical process industry — and without new process equipment it's hard to compete with the very large firms.

There's no question about it — the medium sized firm pays *proportionately* more for everything — engineering, research, development, borrowing money, etc. Its tax rate is the same as that of the multi-billion dollar corporation which has a much easier time acquiring new capital.

Some medium sized companies have had no success in borrowing from banks at *any* price. Some must lease new equipment; others buy used equipment on time payments.

I have little knowledge of the administrative difficulties of Mr. Moffit's plan — but new ideas are sorely needed in this area.

Your magazine should invite others to present their plans. For example, a *graduated* business tax has been suggested.

Generally speaking the chemical process industry has been slow in pushing for new ideas in this very important area. Why is this? Your exposure of this subject is a welcome one. In my opinion, this type of subject matter should be continued.

JOHN J. MAHONEY

New York City

Gentlemen:

I read Mr. Moffitt's article on a new tax plan . . .

This plan is a very interesting one and one which would be attractive to a growth company such as ours. Such a plan would be a real stimulus to us since much of our growth has been accomplished out of earnings.

I feel more widespread attention should be given to Mr. Moffitt's suggestion.

DONALD A. BENDER
Vice President
The Carwin Company
North Haven, Conn.

FOR CORROSION RESISTANCE AT ELEVATED TEMPERATURES

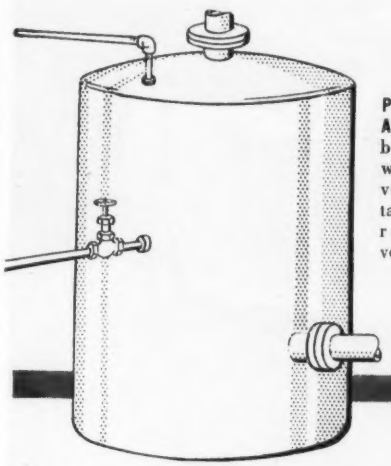
check the Penton* package

A completely new thermoplastic with a broad spectrum of corrosion resistance, Penton may well supply the answer to some of your toughest corrosion problems —particularly at elevated temperatures.

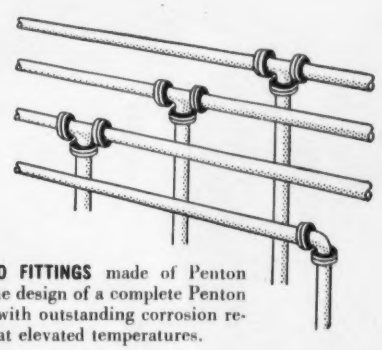
The unique combination of mechanical and chemical-resistant properties found in Penton, combined with the ease and economy with which it can be fabricated, makes this new material ideal for the production of anti-corrosive equipment in many forms. Although new as a commercial product, Penton has been thoroughly evaluated and its usefulness proven in many tough corrosive exposures even at temperatures exceeding 300°F.

Check the advantages of the proved-in-use Penton package for complete processing systems. Valves, pipe and fittings, pumps and meters, flame-sprayed or whirl-sintered metal parts—all are now available for immediate use offering the extra protection of Penton. We'll be glad to put process equipment users in touch with a manufacturer who now offers Penton products.

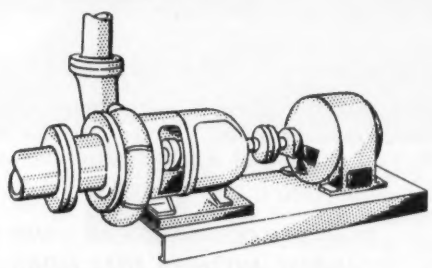
Whether you are a user or manufacturer of processing equipment you'll want to know more about Penton. Write for a copy of "The ABC's of Penton for Corrosion Resistance" or the technical brochure designed for equipment manufacturers.



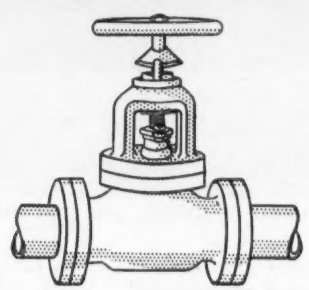
PENTON COATINGS AND LININGS applied by flame-spray or whirl-sintering convert ordinary metal tanks into highly corrosion-resistant vessels.



PIPE AND FITTINGS made of Penton enable the design of a complete Penton package with outstanding corrosion resistance at elevated temperatures.



PUMP AND METER PARYS molded with Penton or made with Penton-clad metal extend the usefulness of this new plastic in processing systems.



PENTON VALVES of many types, solid or lined, can now be obtained in sizes up to 6 in., meet many service needs previously requiring higher-priced glass or metal alloy parts.

Cellulose Products Department

HERCULES POWDER COMPANY

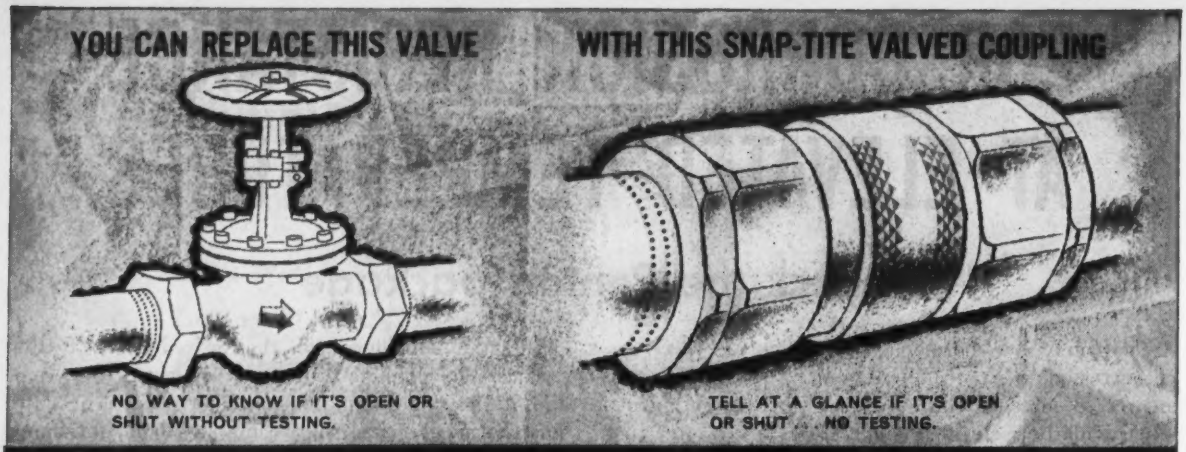
INCORPORATED

900 Market Street, Wilmington 99, Delaware

*Hercules Registered Trademark for Chlorinated Polyether

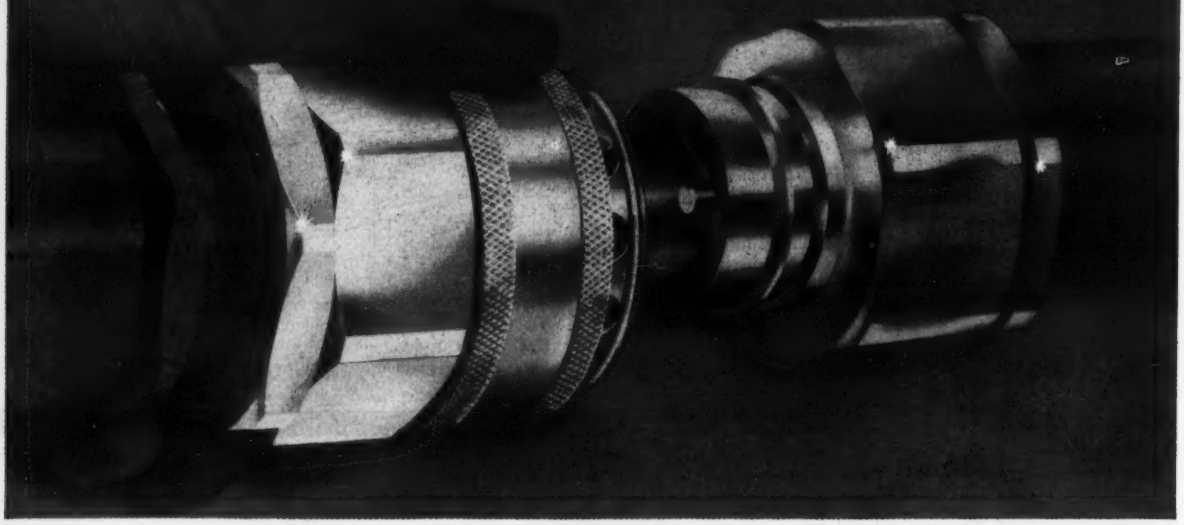
CP58-6

Check 1008 opposite last page


YOU CAN REPLACE THIS VALVE
WITH THIS SNAP-TITE VALVED COUPLING
NO WAY TO KNOW IF IT'S OPEN OR SHUT WITHOUT TESTING.
TELL AT A GLANCE IF IT'S OPEN OR SHUT . . . NO TESTING.

A CHALLENGING NEW CONCEPT-

AUTOMATIC VALVING



The *instant* the two halves of the Snap-Tite valved coupling are connected there is full, free flow through it. No tedious turning of wheels as in conventional valves. When you want to shut off the Snap-Tite valved coupling, you just pull back the sleeve. You can tell at a glance the line is closed.

Leakage past conventional valves is difficult to find . . . not so with Snap-Tite valved couplings! Further, Snap-Tite valved couplings take up less space. So, why not switch to Snap-Tite automatic valving? Eliminate the possibility of incorrectly set or leaking valves and save time in installation and maintenance. Investigation might show considerable savings.

Sizes ¼" to 10" of all machineable metals

For more information, write for Snap-Tite catalog and, if you wish, outline your problem. Your local Snap-Tite representative will be glad to advise you.

SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS

Snap-Tite, INC.

UNION CITY 6, PENNSYLVANIA

Check 1009 opposite last page

conventions and exhibits

September 4-5. International Conference on Air Pollution, American Society of Mechanical Engineers, Hotel Statler, New York.

September 7-12. American Chemical Society, National Meeting, Chicago.

September 9. Synthetic Organic Chemical Manufacturers Assn., luncheon meeting, Hotel Roosevelt, New York.

September 9-12. Tenth National Chemical Exposition, International Amphitheatre, Chicago.

September 15-19. Instrument Society of America, Annual Instrument-Automation Conference and Exhibit, Pennsylvania Convention Hall, Philadelphia.

September 21-24. American Institute of Chemical Engineers, Regional Meeting, Hotel Utah, Salt Lake City.

September 24-26. The Chemical Market Research Association, Market Research Conference, French Lick-Sheraton Hotel, French Lick, Indiana.

September 29-*October* 1. Second Conference on Analytical Chemistry in Nuclear Reactor Technology, Civic Auditorium, Gatlinburg, Tennessee.

September 29-*October* 3. American Society of Tool Engineers, Semi-annual Meeting and Western Tool Show, Shrine Exposition Hall, Los Angeles.

October 5-8. Federation of Paint and Varnish Production Clubs, 36th Annual Meeting, and the 23rd Paint Industries' Show, Cleveland Public Auditorium, Cleveland.

October 5-8. National Association of Corrosion Engineers, Northeast Regional Meeting, Somerset Hotel, Boston.

October 8. Synthetic Organic Chemical Manufacturers

Association, luncheon meeting, Hotel Roosevelt, New York.

October 14-16. Society of Industrial Packaging and Materials Handling Engineers, 1958 National Industrial Packaging, Handling and Shipping Exposition, Coliseum, Chicago.

October 15-17. National Association of Corrosion Engineers, North Central Regional Meeting, Cincinnati, Ohio.

October 20-22. American Oil Chemists' Society, Fall Meeting, Sherman Hotel, Chicago.

October 20-24. National Association of Corrosion Engineers, South Central Regional Meeting, Roosevelt Hotel, New Orleans.

October 20-24. National Safety Congress and Exposition, Conrad Hilton Hotel, Chicago.

October 21. American Society of Safety Engineers, Annual Meeting, Conrad Hilton Hotel, Chicago.

October 27-31. American Society for Metals, National Metal Exposition and Congress, Cleveland Public Auditorium, Cleveland.

October 28. Association of Consulting Chemists and Chemical Engineers, Annual Symposium and Banquet, Biltmore Hotel, New York.

October 30-*November* 1. American Association of Textile Chemists and Colorists, 37th Annual National Convention, Conrad Hilton Hotel, Chicago.

November 12-13. Chemical Market Research Association, Fall Meeting, St. Paul Hotel, St. Paul, Minnesota.

December 1-5. 23rd National Exposition of Power and Mechanical Engineering, The American Society of Mechanical Engineers, Coliseum, New York.

CELULOSA DE CHIHUAHUA, S.A., CHIHUAHUA, MEXICO • CIA DE LOS FABRICAS DE PAPEL, MEXICO CITY, MEXICO • INTERNATIONAL FERMONT MACHY. CO., TANINS REY—SAILLAT, **FRANCE** • NEW ZEALAND FOREST PRODUCTS, AUCKLAND, NEW ZEALAND • SOUTH AFRICAN PULP & PAPER IND., JOHANNESBURG, SOUTH AFRICA • CELULOSA DE CHIHUAHUA, S.A., CHIHUAHUA, CHI. MEXICO • PARSONS & WHITTEMORE, INC., EXPORT TO **BRAZIL** • SOUTH AFRICAN PULP & PAPER LTD., JOHANNESBURG, **SOUTH AFRICA** • TECNICA CUBANA, S.A., HAVANA **CUBA** • UNION CORP. LTD., SOUTH AFRICAN PULP & PAPER IND., JOHANNESBURG, **SOUTH AFRICA** • CELLULOSA DE CHIHUAHUA, CHIHUAHUA, CHI. MEXICO • DORR-OLIVER INC., STAMFORD, **CONN.**, MINISTERIO DE MINAS, VENEZUELA • BADRENA & PEREZ, INC., HATO REY, PUERTO RICO • ANNIBAL R. DE MATTOS, • DISTILLERS CO. LTD., B. F. GOODRICH CO., BARRY, SOUTH WALES, ENGLAND • MONSANTO CHEM. CO., SPRINGFIELD ETINO QUIMICA-BARCELONA, **SPAIN** • SOCIETA IND. CHEMICHE EDISON, MILAN, **ITALY** • NEW ZEALAND CO-OP DAIRY CO., KIREPEHI, **NEW ZEALAND** • ESCUELA NACIONAL DE CIENCIAS UNIVERSIDAD NACIONAL AUTONOMA, MEXICO F. MEXICO • KONINKLIJKE, ZWAVELZUURFABRIEKEN, BORREGAARD CO. INC., SARPS BORG, **NORWAY** • CELANESE MEXICANA, S.A., ZACAPU, MICHOACAN, MEXICO • OSCAR KOHORN & CO. LTD., N.Y., **EGYPT** • OSCAR KOHORN & CO. KROGER COMPANY, CINCINNATI, **OHIO** • THILMANY PULP & PAPER COMPANY, KAUKAUNA, **WISCONSIN** • NATIONAL POTASH, CARLSBAD, **NEW MEXICO** • E. R. SQUIBB & SONS NEW BRUNSWICK, **NEW JERSEY** • SPRINGS COTTON MILLS, LUMBERTON, **SOUTH CAROLINA** LTD., SAO PAULO SANTOS, BRAZIL VAC. SALT CO., ELWORTH, SANDBACK, CHESHIRE, LONDON, **ENGLAND** BRUSSELS, **BELGIUM** • ETS. A. BRUYAUX, BRUSSELS, BELGIUM • CALLAN, SIMON & NORTON INC., KYOWA FERMENTATION IND. LTD., TOZAI KOEKI KAISHA LTD., TOKYO, JAPAN • CELOREY, S.A. CALZADA DOLORES, APARTADO POSTAL 1738, MONTERREY, N. L. MEXICO • CELULOSA DE CHIHUAHUA S.A. CHIHUAHUA CHI. MEXICO • CHILEAN NITRATE SALES CORP., CIA. SALITRERA DE TARAPACA, IQUIQUE, **CHILE**, S.A. • SAO PAULO, **BRAZIL** • INDUSTRIA COLUMBIANA DE RAYON, BARRANQUILLA, COLOMBIA • OSCAR KOHORN, **CHILE** • N. V. KUNSTZIJDESPINNERIJ NYMA NIJMEGEN, HOLLAND • KJOWA FERMENTATION IND. LTD., TOKYO, **JAPAN** • THE NEW ZEALAND CO-OP DAIRY, WAHAVOA, NEW ZEALAND • NEW ZEALAND COMPANY, MILANO, ITALY • SAID, S.A., QUILLOTA, **CHILE** • ABURDARVEN, H.F., (SINGMASTER & BREYERS), REYKJAVIK, **ICELAND** • ALGEMEEN V., ARNHEM, HOLLAND • AMERICAN SMELTING & REFINING, CUBA **CUBA** • OSCAR KOHORN & CO. LTD. NEW YORK, **EGYPT** • OSCAR KOHORN SAO PAULO SANTOS, BRAZIL • KOPPEL ENGRG. LTD., AFRICAN EXPLOSIVES & CHEMICAL IND., MODDERFONTEIN, SOUTH AFRICA • RAYON CONSULTANTS INC., BARRANQUILLA COLOMBIA • SINGMASTER & BREYER, REYKJAVIK, **ICELAND** • SULFATO IMPERIAL CHEM. & CO. LTD., AUSTRALIA • INCANDESCENT HEAT CO. LTD., CHAS. PFIZER & CO., BIRMINGHAM, ENGLAND • INCANDESCENT HEAT CO., SMETHWICK, BIRMINGHAM, ENGLAND, **SCOTLAND** • INCANDESCENT HEAT CO., SMETHWICK, BIRMINGHAM, ENGLAND, FISONS LTD. GRINSBY, LINCS, ENGLAND • IN RAYON CONSOLIDADA S.A., BARRANQUILLA, S.A. • **NEW ZEALAND** CO-OP DAIRY CO., WAHAROA, NEW ZEALAND • NEW ZEALAND CO-OP DAIRY CO., AWAMUTU, NEW ZEALAND • NEW ZEALAND CO-OP DAIRY CO. • NEW ZEALAND CO-OP DAIRY CO., WAHAVOA, NEW ZEALAND • SAID, S.A., QUILLOTA, CHILE • SALT CHEMICALS, INC. TARRYTOWN, N.Y., LIMA, **PERU** • COMPANIA SANSINENA, **ARGENTINA** • SHARPLES CORP. PHILA., **PA.** SO. GEORGIA, **AUSTRALIA** • SKENAND RAYON CORP. N. Y., NATIONAL FORT BOMBAY, INDIA • SULFATO DE VIESCA, S.A., COAHUILA, MEXICO DE VERACRUZ, MEXICO • ABURDARVEN, REYKJAVIK, ICELAND • WERPEN N.V., ARNHEM, **HOLLAND** • ARTSELA, MEXICANA KUNSTZIJDE ALVARO MEXICO • AUSTRALIAN PAPER MFG. LTD., MELBOURNE • AYOTLA TEXTIL, S. MEXICO D.F., MEXICO • CARRIER CORP., HONOLULU MEXICAN S.A., ZACAPU MICHOACAN • CELULOSA DE CHIHUAHUA HUA, MEXICO • CENTRAL RAYON CORP. N.Y., CIA SALITRERA DE TARAPACA CHILEAN NITRATE SALES CORP. S.A., HAVANA **CUBA** • COMPANIA RAYONERA CUBANA, INC. ANDERS JAHRE ALASKA • MONBUSI, GONG, **PAKISTAN** PAKISTAN, CHITTA COMPANIA POR **COLOMBIA** S.A. • N.Y., INDUSTRIAL CONSULTANTS INC., S.A., HAVANA TECNICA CUBANA, CHESHIRE ETHYL CO., CAN PULP & PAPER IND., SOUTH AFRICAN DE MEXICO CIONAL VON ITALY SANTA ULOSA ED

Swenson processing equipment means quality to our customers round-the world

a qualidad SPRAY DRYERS

la qualité CRYSTALLIZERS

la Calidad EVAPORATORS

la qualita' PULP WASHERS

Send for your copy of the new full-color Bulletin SW 401, "Swenson Parallel Flow Spray Dryers." Write Swenson Evaporator Company, 15667 Lathrop Avenue, Harvey, Illinois.

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

SWENSON

Proved Engineering for the Process Industries Since 1889

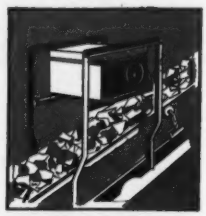
A Division of WHITING Corporation

WHITING- MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY and RAILROAD EQUIPMENT

Check 1010 opposite last page

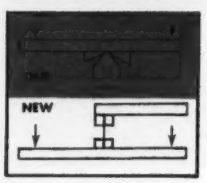
NEW Thayer Inventory Scale

Totalizes continuously and accurately any material being conveyed on an endless belt. Newly designed Thayer Scale fits over level or inclined systems at any location for direct or remote reading. Thayer Scales of 100 lbs. or 300 tons per hour capacity are available.



Recalibrates linearly with direct setting by just placing a known weight on the scale platform. The belt is not disturbed. No chains or involved calculations are necessary. Setting is positive, accurate, and long lasting.

Exclusive Thayer Plate Leverage System is guaranteed accurate for the life of the scale. There are no knife-edge pivots to wear down. Neither dust nor dirt nor vibration can affect its high accuracy. Thayer Scales are unsurpassed for simplicity and reliability under rugged conditions.



Write us about your bulk weighing problems for inventory or batching purposes.

THE Thayer SCALE

*THE THAYER SYSTEM OF PROCESS CONTROL BY WEIGHT

AUTOWEIGHTION

THAYER SCALE CORP., 6 Thayer Park, Pembroke, Mass.

Check 1011 opposite last page

Watching Washington

Antitrusters Keep Pressure On CPI, Government Economists Concerned

It seems there is no out-of-bounds for the antitrusters as they charge pell-mell down the industrial fairways. Along with the hard-pressed CPI, golf club makers and pickle packers are among those feeling the sting of the peripatetic antitrust division of the Department of Justice. Of direct interest to the CPI — the latest — and one of the strangest — is Justice's suit against Lever Brothers and Monsanto Chemical. (See "Watching Washington," July and August, 1958.)

The Government contends Lever should divest itself of the detergent, "all," because the sale lessened competition in the detergent field and eliminated competition between Monsanto and Lever.

Anyone acquainted with the business scene knows that Monsanto decided it wasn't geared for the high-pressure marketing required in the consumer soap field — and wouldn't take "all" back as a present. Similarly, the Justice Department blithely ignores the fact that Lever daily faces the formidable competition provided by such firms as Procter & Gamble and Colgate.

Informed sources here say that government economists are concerned about the apparent lack of business considerations in recent antitrust cases and that a confidential report on the subject has been presented to antitrust division head, Victor Hansen. Existence of the report had not been officially confirmed at press time.

Also, a special Senate Small Business Committee has openly critized the Department of Justice for accepting out-of-court settlements from antitrust law violators. The committee said 83 percent of antitrust cases last year were settled via consent decrees which permit violators to escape triple damages which may be assessed in antitrust cases. This type of settlement tends to discourage private business from trying to prosecute antitrust charges.

Some observers feel that step-up in antitrust actions is part of a program to show that the Eisenhower Administration is not controlled by "big business." Whatever the reason, the CPI is getting hit harder than most. From here on out, companies should have the antitrust laws uppermost in mind as they conclude agreements regarding cooperative research, patents, or anything that might in any way "tend to lessen competition."

Drug Case affects labeling bill

The Federal Hazardous Articles Act (S.1900 — H.R.9063) introduced by Senator Prescott Bush (R., Conn.) will undoubtedly wind up with amendments following the precedent-making ruling of the Florida Supreme Court in the Tampa Drug Case.

The Bush Bill, worked out in cooperation with industry and government specialists, sets forth proposed precautionary labels for various types of potentially hazardous products.

A fly turned up in the ointment when the Florida Supreme Court awarded $160,000 in damages to a widow whose husband died a few hours after working at home with carbon tetrachloride (technical).

Although the product was labeled with various cautions and the deceased was a "reasonable, intelligent man," the court held that the *degree of intensity* of the warnings on the label was not sufficient to hold that the deceased was negligent.

The Florida decision will probably be appealed to higher courts. Senator Bush's office is studying the decision to determine what effect it will have on the Bush Bill which will be reintroduced in the next session of Congress.

One advantage of a Federal bill is that it would standardize labeling requirements throughout the country, thus eliminating the possibility of state or local laws which would place an undue burden on manufacturers of products that are nationally distributed. Eight states and the Territory of Hawaii now have labeling laws — usually based on Manual L-1 (Labeling), produced and recommended by the Manufacturing Chemists' Association.

Meantime, chemical processors with hazardous products carrying precautionary labels would do well to look into their *degree of liability* in light of the precedent set in the Tampa Drug Case.

FDA OK's Curtis Bill — with some changes

After almost a year's mulling-over, FDA has finally released its opinion on the Curtis "color" bill (H.R. 8945).

In a report to the House Interstate and Foreign Commerce Committee, FDA follows industry in an all-out recommendation for a new liberal color law. While favoring the principles of the industry-sponsored Curtis Bill, FDA wants some changes made.

First, why a new law?

Present Food, Drug and Cosmetic Act regulations on the use of coal-tar colors are stringent and inflexible. Under the 1938 Act, coal-tar colors must be from certified batches and FDA is authorized to certify a coal-tar color only if it is "harmless and suitable for use."

FDA interprets the law to mean "harmless" regardless of the amount used. Under this "harmless per se" interpretation, both industry and FDA have their hands tied

Foxboro introduces

ELECTRONIC CONSOTROL* INSTRUMENTATION

On September 15th, at the I.S.A. Show in Philadelphia, The Foxboro Company will unveil Electronic Consotrol Instrumentation...counterpart of its world-famous pneumatic Consotrol line. ✓ ✓ ✓ Including a complete range of transmitters, indicators, recorders, controllers and valve operators, Electronic Consotrol Instrumentation covers every function in the control loop...provides advanced-design electronic control systems for all modern requirements. ✓ ✓ ✓ In these systems, process measurements such as temperature, pressure, flow and level, are converted to a proportional current signal at the transmitter. Long-distance transmission is instantaneous...over unshielded lines...to small-case, Consotrol panel-type receivers at the central control station. ✓ ✓ ✓ The full story on this major Foxboro contribution to better process control will be presented in Booth No. 12-72 at the I.S.A. Show. Or, write for comprehensive Bulletin 21-10. The Foxboro Company, 819 Neponset Ave., Foxboro, Mass.

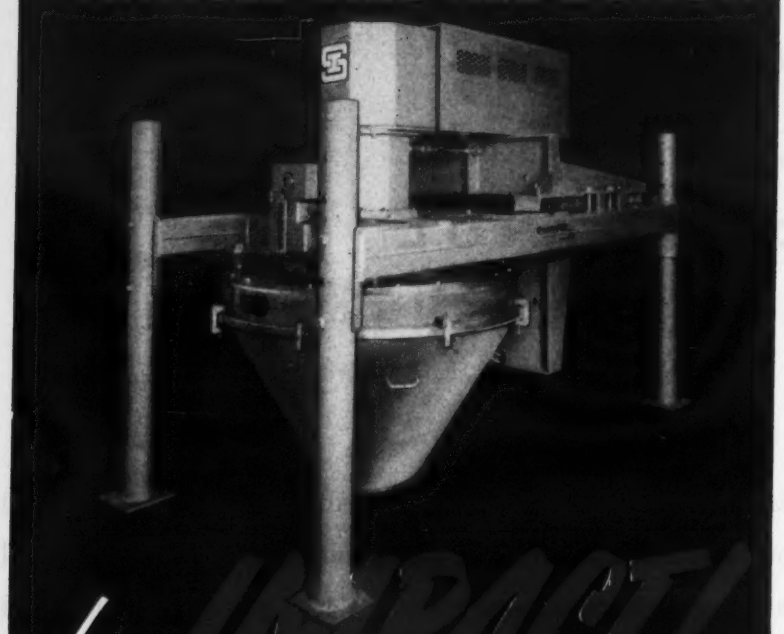
*Reg. U.S. Pat. Off.

FOXBORO
REG. U.S. PAT. OFF.

Foxboro makes a better instrument...
or Foxboro doesn't make it

Check 1012 opposite last page

PARTICLE SIZE REDUCTION



by IMPACT

RESULTS

PROBLEM:
To obtain closely controlled particle size reduction on a heat sensitive product near its softening point.

MATERIAL:
Polyvinyl Alcohol Resin.

SOLUTION:
Installed ENTOLETER® CentriMil . . . Series 40

EVALUATION:
1. Low Heat Rise.
2. Uniformity of Particle Size
3. Reduction of Product Loss Caused by Dust or Undesirable Fines.
4. Higher Bulk Density . . . Reduced Size of Bagging for Easier Handling . . . Cut Storage Space Requirements.
5. A Higher Quality and Dependable Product.

You may have a similar problem . . . or a completely different one. In either case, let us help you solve it . . . at lowest cost . . . with best results.

For NEW descriptive bulletins or information on FREE sample test processing in our Development Laboratory . . . contact the Entoleter Division, P. O. Box 904, New Haven, Connecticut.

ENTOLETER DIVISION
SAFETY INDUSTRIES, INC.
P. O. BOX 904 NEW HAVEN 4, CONN.

PINTSCH COMPRESSING CORPORATION
LIQUIGAS LIMITED
ELECTRICAL DIVISION

LIGHTING DIVISION
SAFETY RAILWAY SERVICE CORPORATION
ENTOLETER DIVISION

AUTOMATIC TIMING & CONTROLS, INC.
THE HOWE SCALE COMPANY
SI HANDLING SYSTEMS

Check 1013 opposite last page

when it comes to dealing with current coal-tar color questions. Moreover, if present rules continue in force, chances are many colors now in use in food, drugs, and cosmetics would eventually be banned.

The Curtis Bill, on the other hand, would set up a new system for certifying coal-tar colors which would permit the Government to set tolerances for colors and specify conditions of use.

Also proposed is a change in the FD&C Act which would place all "color additives" — natural, synthetic, and coal tar — under the same set of rules.

In particular, the bill would require "separate listing" of colors suitable for use in food, drugs, and cosmetics, and which are *harmless under the conditions of use specified in such listing.*

FDA would be authorized to establish *maximum tolerances* for use of any listed color additive in or on different products.

The Curtis Bill would also permit exemption from certification of color additives when certification is *not necessary to protect the public health.*

Principal objection to the Curtis Bill from FDA's vantage point concerns the "grandfather clause in its present form." According to FDA, the provision is not "compatible with adequate protection of the public health." Also under fire is the clause which places with FDA the burden of testing colors now in use; the agency feels that industry should share the re-testing task.

In short, FDA is anxious for a "legislative re-examination of the entire subject of color additives." They're looking for — in the strong words of the recently issued report — "new and clear statutory directives as to national policy in this field and as to our duty in carrying out that policy."

Predictions are that an amended bill, incorporating certain FDA recommendations, will be reintroduced next session of Congress.

In the meantime, the eyes of FDA and industry are on

Mono Oleates Di

of

Diglycol
Ethylene Glycol
Diethylene Glycol
Polyethylene Glycol
Propylene Glycol
Polyoxyethylene
Butoxyethyl
Glycerine

MADE TO MEET YOUR SPECIFICATIONS

THE FLAME AND THE FLASK — SYMBOL OF QUALITY

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
5147 W. 67th Street, Chicago 38, Illinois
AKRON, OHIO • NEWARK, N. J.
CHICAGO, ILL. • LOS ANGELES, CAL.

Check 1014 opposite last page

Solve level control problems!

TRIMOUNT
proximity
CONTROL
"FAIL SAFE"

Used with a variety of materials*, the multiple application Trimount Proximity Control has become an indispensable tool of industry. Exclusive, simplified panel controls, including a visual meter and test button, allow the operator to monitor the operation sequence at any time. The FAIL SAFE design of the Trimount Proximity Control eliminates costly breakdowns and waste. Standard probes cover most applications and special types are available when required.

WRITE FOR CATALOG AND COMPLETE INFORMATION!

POSITIVE PROTECTION IN:

- High and Low Level Alarm
- High and Low Level Fail Safe Control
- Differential Level Control
- Interface Control

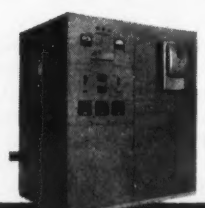
TRIMOUNT
INSTRUMENT COMPANY
Dept. CP-98, 3119 West Lake Street, Chicago 12, Ill.
Booth 1151

*Non-conductive liquids, semi-solids, and free-flowing granular materials.

EFFICIENT

Sel-Rex®
CUSTOM ENGINEERED
RECTIFICATION

- Germanium
- Silicon
- Selenium



Semiconductor elements, controls, cooling systems — every component used in Sel-Rex Rectifiers is determined by the specific application. Similarly rated units, in slightly dissimilar applications, often have components from several different "name-brand" sources. "Custom-Engineering" like this guarantees you the most efficiently operating rectification it is possible to build.

Send for FREE "GUIDE" to Industrial Rectifier Equipment.

Rectifier Division
SEL-REX CORPORATION
NUTLEY 10, NEW JERSEY
Representatives in Principal Cities
Complete Semiconductor Power Conversion Systems for any AC to DC application

Check 1015 opposite last page

the Supreme Court's upcoming case on coal-tar colors. It's up to the Court to resolve two conflicting decisions involving FDA's scope in testing and certifying colors.

The Second Circuit Court of Appeals has upheld FDA's interpretation that coal-tar colors can be certified only if they are completely harmless regardless of the quantity used. A contrary decision in the Fifth Circuit Court of Appeals holds that FDA has authority to certify colors as safe if they are harmless in the amount that is normally used (what the Curtis Bill would provide).

If the schedule's adhered to, the Supreme Court should weigh this one some time in October.

Kennedy-Ives Bill contains sleeper

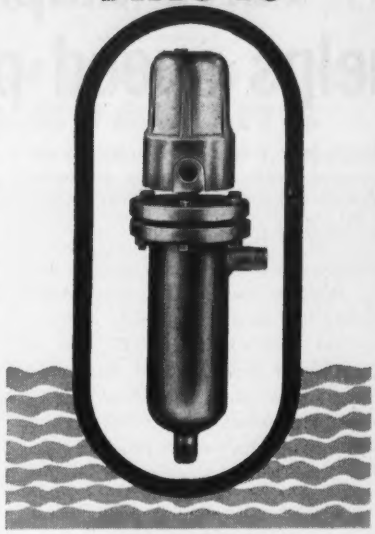
A little-noticed sleeper in the Kennedy-Ives Labor Bill will affect you if your firm spends $5000 a year or more in communicating with employees. Section 103 (a), written to compel employers to reveal the amount of money and extent of effort in influencing employees about labor union membership, is so equivocal that it could be construed to include everything from house organs to bulletin board notices. If an employer doesn't file answers in sufficient detail, he is subject to a $10,000 fine and one year in jail.

Chemical union merger

Preliminary merger talks have already been held between the Oil, Chemical and Atomic Workers and the International Chemical Workers. Talks were instigated by OCAW (formerly CIO) President O. A. Knight. Proposal was well received by ICW's President Walter Mitchell.

The two unions have been working in close cooperation since the AFL-CIO merger. National headquarters policy is to encourage such mergers whenever possible.

This is



LEVEL MASTER®

The UNFAILING Liquid Level Control!

The ability to function with *continuous, sensitive control* with liquids is the standout feature of Level Master. The "brain" of Level Master is the unique Bell Magnetic Proximity switch incorporating a permanent Alnico V magnet that responds instantly to changes in liquid level!

- *Models for all types of liquids.*
- *Horizontal, vertical, external mountings.*
- *Precision engineered for long life operation.*

For full information consult your Level Master representative or write directly to:

JO-BELL PRODUCTS, INC.
5456 W. 111th St. • Oak Lawn, Ill.
Phone GArden 5-0240

Jo-Bell Products, Inc. Dept. B
5456 W. 111th St., Oak Lawn, Ill.
Send full information on Level Master and name of nearest representative.
My name_____
Company_____
Address_____
City_____ Zone____ State____

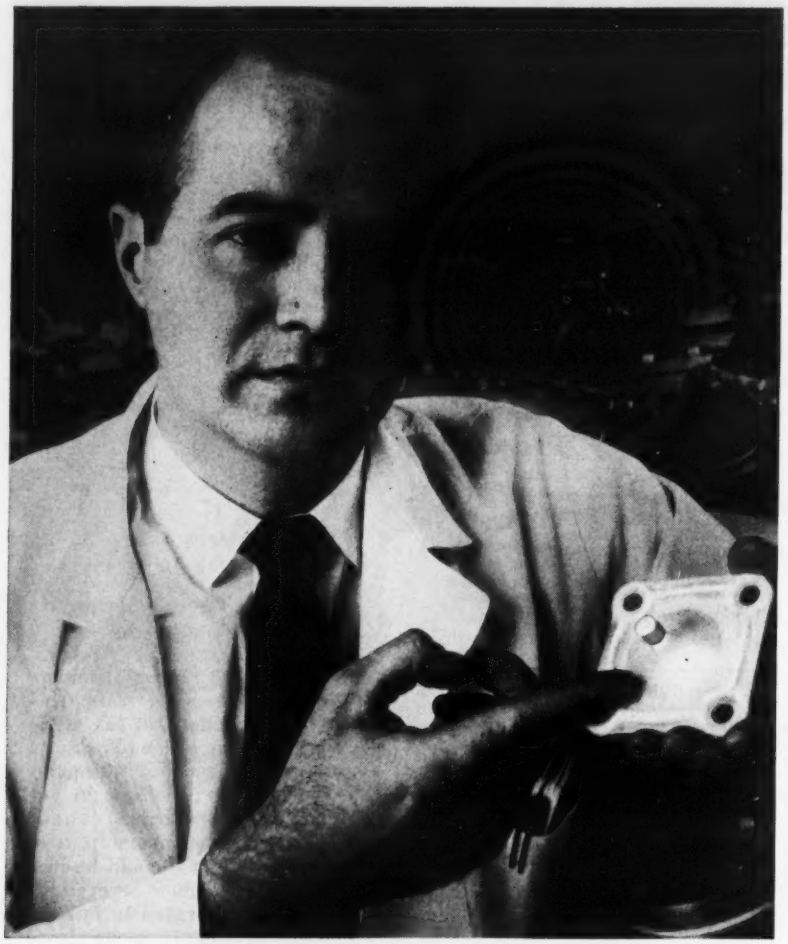
Check 1015A opposite last page

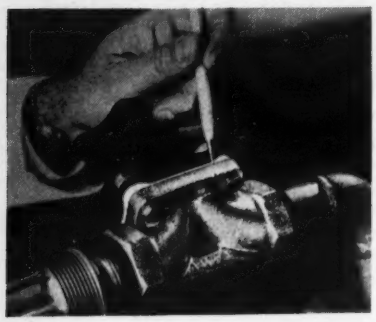
Valve diaphragm of R/M TEFLON* helps speed production of polio vaccine!

Here's how Raybestos-Manhattan cooperated with a customer to make possible faster production of vitally needed Salk polio vaccine.

Salk vaccine is 20 days in the making, requires another 110 for testing. During this time the portable processing tanks must be sealed off from all possibility of contamination. Processing temperatures range from 5 to 150°C. Diaphragm valves were chosen for this work because they make possible complete cleaning and sterilization.

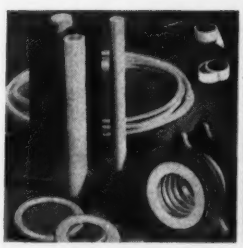
The solid valve diaphragms originally used were unable to withstand the extreme operating conditions involved. R/M "Teflon" was selected for the task because of its strength, flexibility, chemical inertness, and capacity to endure—unchanged—the wide range of temperatures necessary.

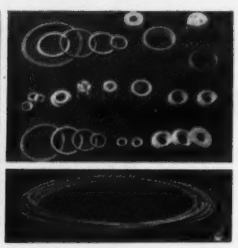




R/M worked closely with the customer and promptly developed a new method of molding a "Teflon" valve diaphragm ideally suited to this exacting need. The new "Teflon" diaphragm was much thinner than the one formerly used, with improved flex life that permitted a greater number of manufacturing cycles—this without danger of valve failure at a critical point in the process.

*A DuPont trademark





Other R/M products for the chemical industry include flexible thin-wall "Teflon" hose; custom-machined parts; rods, sheets, tubes and tape; centerless ground rods held to very close tolerances; stress-relieved molded tubes and rods; gaskets, expansion joints, and flexible couplings; bondable tape and sheets for linings; Raylon (R/M trade name for mechanical grade "Teflon") which has many characteristics of virgin "Teflon."

RM

RAYBESTOS-MANHATTAN, INC.

PLASTIC PRODUCTS DIVISION FACTORIES: MANHEIM, PA.; PARAMOUNT, CALIF.

Contact your nearest R/M district office listed below for more information or write to Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.

BIRMINGHAM 1 • CHICAGO 31 • CLEVELAND 16 • DALLAS 26 • DENVER 16 • DETROIT 2 • HOUSTON 1 • LOS ANGELES 58 • MINNEAPOLIS 16
NEW ORLEANS 17 • PASSAIC • PHILADELPHIA 3 • PITTSBURGH 22 • SAN FRANCISCO 5 • SEATTLE 4 • PETERBOROUGH, ONTARIO, CANADA

RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber • Sintered Metal Products • Rubber Covered Equipment
Abrasive and Diamond Wheels • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

Check 1016 opposite last page

nuclear notes

Analytical chem confab planned at Oak Ridge

Second conference in a series of unclassified meetings on role of analytical chemistry in nuclear technology will be held at Oak Ridge National Laboratory. Dates are September 29, 30, and October 1, 1958. Details may be obtained from C. D. Susano, Oak Ridge National Laboratory, P.O. Box Y, Oak Ridge, Tennessee.

Boron-10 distribution — AEC changes plan

Revised plan for commercial distribution of boron-10 materials has been put into effect by AEC. Boron, enriched up to 92% in the isotope B-10, will be distributed by the Chicago Operations Office, Lemont, Ill. Boron enriched to greater than 92% may be obtained from Oak Ridge. Latter will also handle distribution of special compounds of boron-10 at 92% assay level, and boron-11, ranging up to 98.5% B-11 content.

Spots radioactivity in water, liquids

Improved detection devices suitable for checking small concentrations of radioisotopes in water and liquids are now in production. The sensitive systems use thin window and thin-wall Geiger-Mueller tubes, as well as scintillation detectors in a special sample housing. Auxiliary equipment, used with these monitors, give an alarm at above normal levels of radioactivity, and provide a continuous, permanent record. Other devices automatically re-route above-tolerance sewage or waste into holding tanks to prevent possible contamination of water supplies.

(Monitoring systems are product of Tracerlab Inc., 1601 Trapelo Road, Waltham 54, Massachusetts.)

Check 1017 opposite last page.

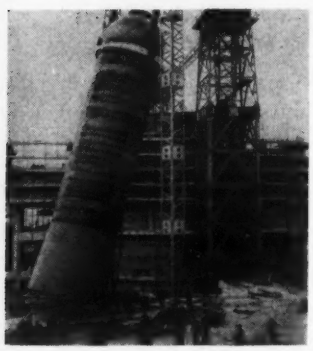
... Significant news about atomic energy

Firm announces entry into fuel element field

National Lead Company is preparing to manufacture major types of nuclear reactor fuel elements for power, research, and propulsion applications. The firm's Nuclear Metals Division in Albany, New York, is scheduled to begin manufacturing activities by early fall.

(Further information about nuclear reactor fuel elements may be obtained from National Lead Company, 111 Broadway, New York 6, New York.)

Check 1018 opposite last page.



Atomic age behemoth . . .

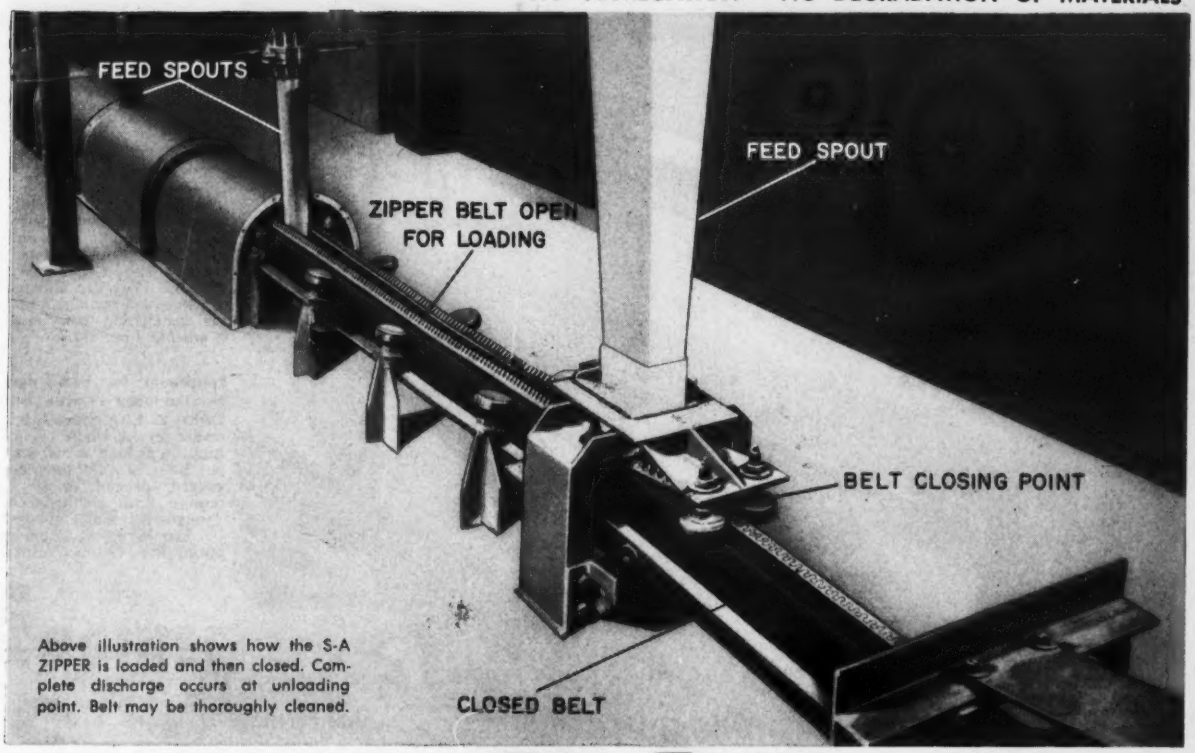
. . . is placed into position at Berkeley nuclear power station, Gloucestershire. The first of 16 giant heat exchangers to be installed at the plant, unit is 17½ ft in diam, 70 ft tall, and weighs 133 tons. When completed in 1960, the British power station will consist of two reactors, have an output of 275,000 kw.

Rocket reactor ready

AEC has announced completion of assembly of an experimental reactor to be used in Project Rover, a study to determine feasibility of nuclear power for rocket propulsion. Reactor, known as KIWI-A, will be tested late this year in initial static ground experiments at Nevada test site.

FRAGILE BULK CHEMICALS ARE HANDLED GENTLY, SAFELY by "ZIPPER" CLOSED-BELT CONVEYORS-ELEVATORS

NO SEGREGATION — NO DEGRADATION OF MATERIALS



Above illustration shows how the S-A ZIPPER is loaded and then closed. Complete discharge occurs at unloading point. Belt may be thoroughly cleaned.

STEPHEN S-A DAMSON MFG. CO.

THE BIG NAME IN BULK MATERIAL HANDLING EQUIPMENT

MAIN OFFICE AND PLANT
11 RIDGEWAY AVENUE
AURORA · ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIF. CLARKSDALE, MISS. • BELLEVILLE, ONTARIO

Bulk materials — granular, flaky, pulverized, or small lump, can be conveyed or elevated in any plane, entirely enclosed, and protected by S-A ZIPPER belts. The most delicate materials are moved swiftly and economically, without degradation, or separation.

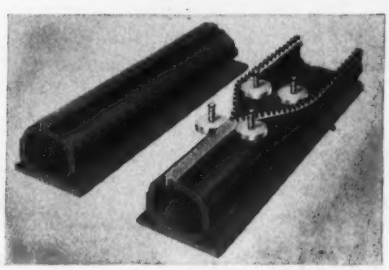
ZIPPER conveyors require no casing, can be used to carry over long distances, around obstructions in numerous flexible arrangements. The belt simply opens to receive material, then zips closed, sealing its load in a dust-tight casing, moving material within the belt over a system of guide rollers and pulleys to any point of discharge.

The ZIPPER conveyor is exclusively an S-A product. It is ideally suited to materials requiring clean and gentle handling. Belt speeds range up to 200 F.P.M., discharge is possible at any point on horizontal, inclined, or vertical runs.

S-A designs and builds conveying systems for all bulk chemical handling requirements. If you have a problem and want expert help, call the S-A sales engineer in your area, or write to any of the main offices listed.

For complete catalog data on ZIPPER conveyors, write for a copy of bulletin 349.

S-A district or main plant offices can supply complete information on any conveyor product, or any phase of chemical product handling. Bulletins on all products available upon request.



Section views thru the endless ZIPPER belt shows how load is completely enclosed. Belt teeth are automatically spread, meshed and locked by means of ball bearing rollers. Material moves forward with belt.

1. Rubber ZIPPER belt open flat for return run and for cleaning.
2. Sidewalls brought into vertical position and ready for loading.
3. Flexible sidewalls completely closed for conveying and elevating.

Check 1019 opposite last page

V219 SEP 58 XUM

Any density-any capacity

Flexmount for light duty service uses leaf springs These oscillating conveyors are ideal for gentle handling of free-flowing materials in lighter duty applications. They're fabricated in widths of 8, 12, 18 and 24 inches —with 4-in. deep troughs. *Available from stock.*

Coilmount for medium duty service uses coil springs. Designed for moderate applications handling mildly abrasive and bulk materials. Coilmounts are available in 10 and 20-inch widths with 6-inch deep troughs. They are shipped in assembled sections, making installation costs low. *Available from stock.*

Torqmount for heavy-duty service uses torsion bar springs. Engineered for severe service where capacities run as high as 500 tons per hour. Torqmounts are rugged, dependable . . . require little maintenance. Trough is easily replaced . . . simply remove bolts securing it to channel frame.

One of these 3

LINK-BELT oscillating conveyors will give low-cost, surge-free flow of your material

No one type of oscillating conveyor is good for all types of duty. That's why Link-Belt builds a complete range of oscillating conveyors for all operating conditions and materials.

Only Link-Belt offers three different design units . . . each engineered for a specific type of service. Their design is the simplest in the oscillating conveyor field and each functions as near to NATURAL FREQUENCY as possible to minimize power requirements. And Link-Belt FULL-TIME POSITIVE ACTION controls the load at all times . . . assures continuous, uniform flow of materials regardless of surges.

For the best in light, medium or heavy-duty conveying, call your nearest Link-Belt office. Or for facts on the *complete line* of Link-Belt oscillating conveyors, write for Book 2744.

LINK-BELT

OSCILLATING CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,557

Check 1020 opposite last page

NUCLEAR NOTES

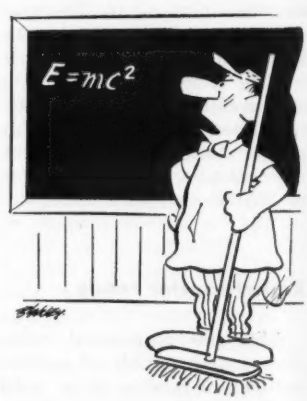
Depleted uranium offered to industry by AEC

Prohibitions on non-nuclear uses of uranium have been removed by AEC and depleted uranium is now available for sale on an unclassified basis. Depleted uranium is material from which part of fissionable U-235 has been removed.

Product contains less than 0.0071 assay weight fraction of U-235 which occurs in nature. Sold as uranium hexafluoride, price per kg for maximum U-235 content material is $38.15. Lower assay product sells for less. Full details may be obtained from AEC, Office of Industrial Development, Washington 25, D. C.

Classified documents at Stanford

US Atomic Energy Commission has contracted with Stanford Research Institute to maintain a classified documents depository to serve western states. Depository includes an initial collection of 7000 reports dealing with various aspects of nuclear energy research. The new facility will serve scientists and engineers from firms holding AEC access permits.



"Of course, why didn't I think of that?"

Drawn by Tom Blakley, Florida East Coast Fertilizer Co., Homestead, Florida.

THAT'S INTERESTING

Lab flight

An "adhesion-distention" test has been prime factor in helping two chemists prove value of bonds between rubber and metal. Jet and rocket parts were put through their paces right in the lab. Bonds were exposed to temps up to 450°F for 96 hr under loads as severe as those found in flight. A section of rubber is put between plates of steel and bonded. Plates can then be forced apart with screws to exert pressure on bond. Whole assembly can be exposed to any atmosphere for test. (ACS Div. Rubber Chemistry)

Seeing atom

For the first time the atom has been photographed. With self-invented high-powered microscope, Professor E. Muller of Penn State U. was able to obtain motion pictures of atoms, magnified up to 3 million times actual size.

For more information on product at right, specify 1021 see information request blank opposite last page.

what sterilizing medium is best suited to your needs?

Steam? . . . Dry Heat? . . . Or Gas?

With the discovery of new media it is now possible to integrate sterilization into your production program. It is possible to sterilize materials which could be injured by dry heat or steam. And it is possible in many cases to sterilize the packaged product.

Castle engineers are prepared to discuss with you *any* sterilizing medium —whether new or conventional—that is best suited to your needs.

You will profit from the 75 years of research and experience behind the Castle Engineered Sterilization Program.

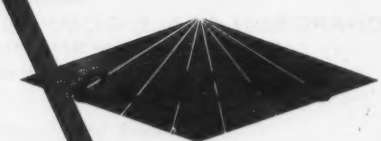
CASTLE ENGINEERED STERILIZATION

Send for this FREE Brochure

Shows how CES helps solve your sterilization problems. Presents latest developments in dry heat, steam and GAS.

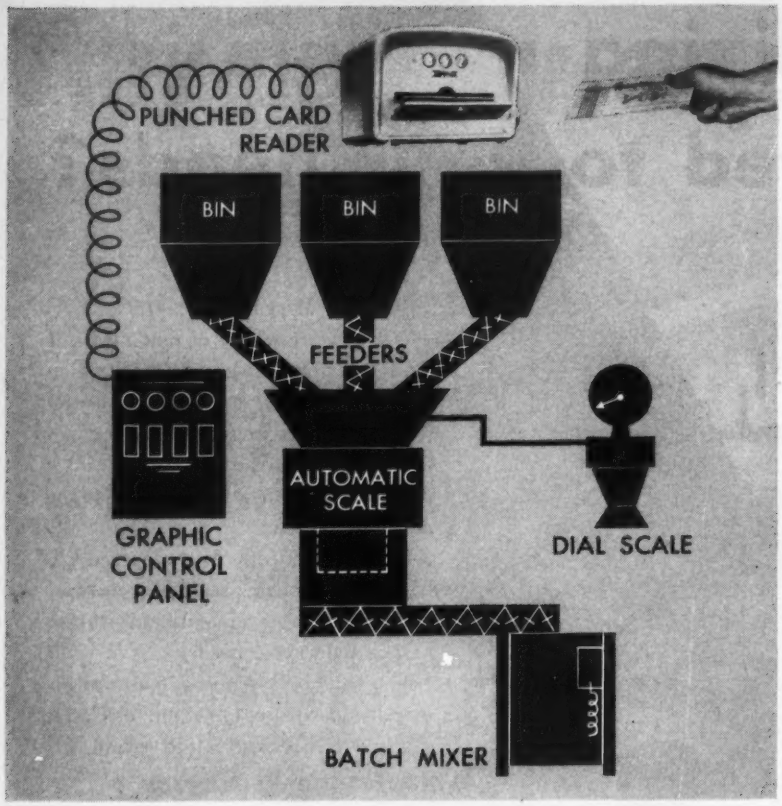
STERILIZATION MOLDED TO YOUR NEEDS

NEW: Now CES makes gas available for terminal sterilization. This process enables gas to penetrate and sterilize the contents of sealed packages. The CES brochure supplies complete details on the economic use of gas sterilization.



WILMOT CASTLE COMPANY

1715-D E. HENRIETTA ROAD • ROCHESTER 18, NEW YORK



RICHARDSON SELECT-O-WEIGH

AUTOMATES

FROM BIN TO BATCH

The Richardson Select-O-Weigh system governs all components required for automatic formulation by weight of any product, liquid or solid, involving any number of ingredients.

- **Programming** – by a Punched Card Reader or alternate control systems
- **Flow Control and Indication** – at one remote control panel, housing complete process circuitry
- **Feeding** – feeders engineered for specific materials and needs
- **Weighing** – by Richardson Automatic Scale, accurate to 1/10 of 1%
- **Mixing** – of ingredients in completed batch
- **Readout** – counters, totalizers, printers, typewriters, recorders of all types

When required, service is available from Richardson's nationwide network of service facilities . . . within 24 hours. Custom-engineered by the world's foremost manufacturer of automatic weighing and proportioning equipment, Select-O-Weigh helps you make a better, more uniform product, at lower cost. For full details write, wire or call today.

Richardson Scales conform to U.S. Weights and Measures H-44 *for your protection.*

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY • CLIFTON, NEW JERSEY

Sales and Service Branches in Principal Cities

Also Manufactured in Europe to U.S. Standards

1558

Check 1022 opposite last page

NUCLEAR NOTES

US industry to exhibit at Geneva atom show

Forty-nine US industrial companies plus the AEC will participate in the commercial exhibition to be held this month in Geneva, Switzerland, in conjunction with the second United Nations International Atoms for Peace Conference. The US portion will occupy about 32,000 sq ft. Focal point and symbol of the American section will be a full-scale model of core of a 150,000-kw atomic power plant.

Atomic power plant for 49th state

First atomic power plant in Alaska is scheduled to be operating in 1960. Designated the APPR-1A, the Army's 1700-kw pressurized-water plant will be installed at Fort Greely, near Fairbanks. Unit will be similar to APPR at Fort Belvoir, Va., but will generate twice the heat of the prototype. Prime contractor is Peter Kiewit Sons of Omaha. Alco Products, Inc. is furnishing the nuclear system.

Plan ultra high-level radiation laboratory

Contract to make feasibility study of an ultra high-level radiation laboratory has been awarded to Vitro Engineering Company, a division of Vitro Corporation of America. Facility would be capable of handling radiation sources more intense than any previously fabricated.

Gas-cooled reactor project started

Contract ($1.35 million) has been awarded to Aerojet-General Nucleonics by AEC for construction of first high temperature gas-cooled reactor experiment (GCRE) facility in the US. Unit is scheduled for completion in May 1959 at National Reactor Test Site, Idaho.

FOR

HOUSE PLANTS

LAWN

GARDEN

COMMERCIAL GREENHOUSE

REODORIZED FERTILIZER!

To the packages of fertilizer and plant food designed for private lawns and gardens, house plants and commercial greenhouses, a new dimension has recently been added in the form of "aromatics". The home gardener who for years has assumed that the unpleasant odor emanating from the package or resulting from the product's wetting, was a necessary evil, is being re-educated to the era of fertilizer aromatics by a number of enterprising producers. In the D&O Industrial Odorant Laboratories, masking and reodorizing compounds have been developed for all types of commercial fertilizer, including those based on *urea, fish solubles, activated sludge, dried blood meal, animal manure, tankage, meat scraps* and *phosphate.* The successful development of such fertilizer odorants has provided an important new merchandising tool to producers...a tool that can be put to work now, for your product by the D&O industrial perfumer. Inquiries are invited.

Write for copy of article entitled "Aromatics in the Fertilizer Industry".

Essentially for You!

D&O ESTABLISHED 1798 ®

OUR 159th YEAR OF SERVICE

DODGE & OLCOTT, INC.

180 Varick Street, New York 14, N.Y.

Sales Offices in Principal Cities

ESSENTIAL OILS
AROMATIC CHEMICALS
PERFUME BASES
FLAVOR BASES
DRY SOLUBLE SEASONINGS

Check 1023 opposite last page

Spotlight On People

DR. THOMAS L. WILSON replaces DR. ARTHUR E. BROOKS as manager of research center of U.S. Rubber Company. Brooks was recently made assistant director of research and development department. T. J. RHODES and DR. D. LORIN SCHOENE are also appointed new assistant directors of research and development.

WILLIAM NADEN is elected president of Esso Standard Oil.

Celanese Corporation's plastics division forms a new marketing department headed up by EDWARD W. WARD. Ward's former position of sales manager for division is now filled by DR. W. PAUL MOELLER. In turn, JAMES W. FLYNN succeeds Moeller as market development manager.

JOHN J. KEILEN JR. joins Charleston Rubber Company as director of research and development.

Two new presidents of Allied Chemical divisions are JACOB WHITE, new head of Nitrogen Division and WILLIAM H. WINFIELD, president of International Division. FRANK J. FRENCH becomes vice president of General Chemical Division.

ROY L. BRANDENBURGER, Monsanto vice president, is appointed senior representative on West Coast.

With the retirement of EARL F. CLARK, FRANK F. BLACK becomes new manager of heavy chemical department at Cowles Chemical Company.

C. C. BRUMBAUGH is appointed a vice president of Diamond Alkali. Succeeding Brumbaugh as director of engineering is ROBERT C. SUTTER.

BRIG. GENERAL CLIFFORD L. SAYRE, director of central engineering for Food Machinery's chemical divisions, is elected by the Armed Forces Chemical Association as its president for the coming year.

News from American Potash's Lindsay Chemical Division . . . GEORGE T. DECK is new vice president and technical general manager and DR. HOWARD E. KREMERS becomes vice

How to beat the high cost of temperature control

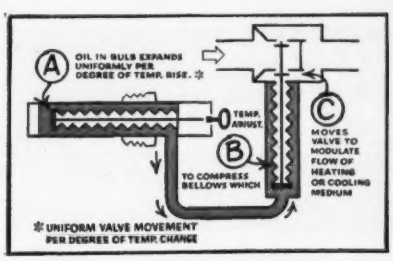
The practical approach to temperature control

By John W. Ritter, Test Engineer, SARCO Company, Inc.

Precise temperature regulation is essential in many processing operations, not only for quality control, but for maintenance of output as well.

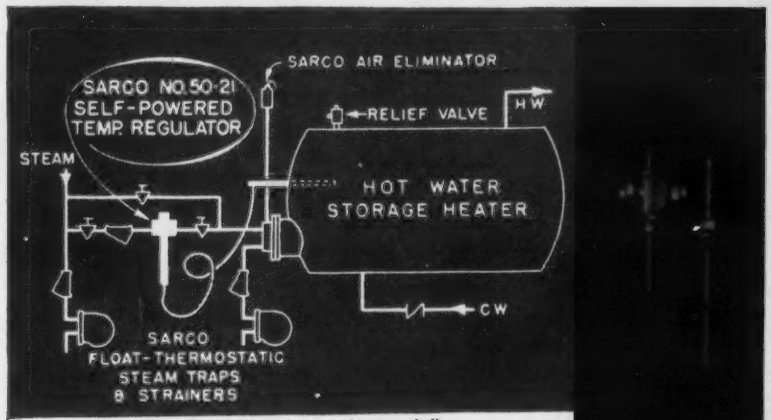
Manual temperature control is unsatisfactory because of the possibility of spoilage and loss of quality control which can result from irregular or indifferent hand regulation.

Automatic controls are available in a wide variety, including pneumatic, electronic, and self-powered. Pneumatic and electronic controls are relatively expensive to purchase and install, and may require frequent maintenance. However, in most applications, control requirements can be achieved very successfully by the use of relatively simple, economical Sarco Self-powered Regulators.


A
OIL IN BULB EXPANDS UNIFORMLY PER DEGREE OF TEMP. RISE. *
TEMP. ADJUST
B
TO COMPRESS BELLOWS WHICH
C
MOVES VALVE TO MODULATE FLOW OF HEATING OR COOLING MEDIUM
* UNIFORM VALVE MOVEMENT PER DEGREE OF TEMP. CHANGE

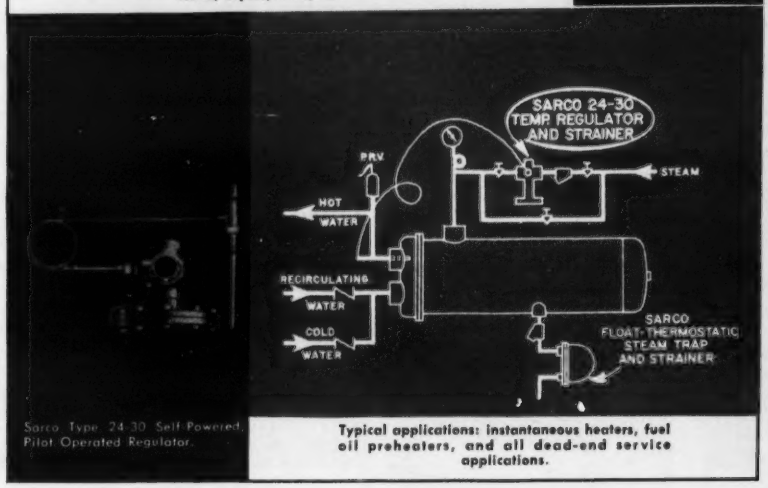
This drawing shows simplicity of operation of the Sarco 50-21 Temperature Regulator, which consists of a thermostat, capillary tubing, and a valve.

Sarco controls, like the 50-21 and the 24-30, have the required degree of sensitivity and dependability, combined with the ruggedness inherent in the sealed capillary tube construction. Because these Sarco controls do not depend on external power, such as electricity or compressed air, they have established long records of sustained, reliable operation. They are an economical and practical solution to the problem of maintaining continuous watchdog duty over processing temperatures.



Typical applications: hot water storage heaters, shell and tube heat exchangers, condensers, oil storage tanks, dryers, kilns, etc.

Sarco Type 50-21 Self Powered Regulator



Sarco Type 24-30 Self Powered Pilot Operated Regulator.

Typical applications: instantaneous heaters, fuel oil preheaters, and all dead-end service applications.

Self-powered automatic temperature regulators by SARCO . . .

have these 5 marked advantages: No compressed air or electrical wiring required. No delicate mechanisms to adjust or maintain. No packing glands to stick or require maintenance. No shutdown during power failure. No specialized maintenance required.

Sarco Self-Powered Controls are self-contained and can be installed by any pipe fitter. They are so reasonable in cost that you can afford Sarco automatic heating controls for every application in your plant. Write for 10-page Sarco Control Bulletin No. 620.

6346-B

SARCO
COMPANY, INC.
635 Madison Ave., New York 22, N. Y.

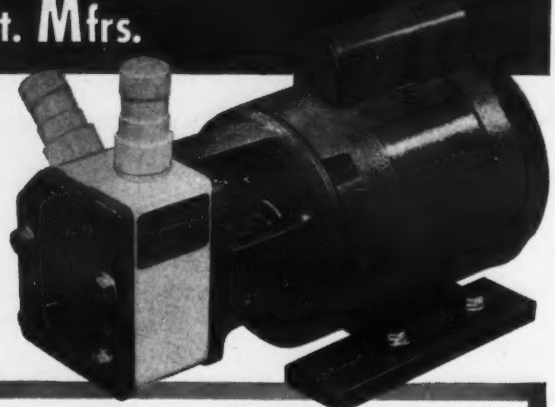
STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

Check 1024 opposite last page

NOW AT LAST! for Orig. Eqpt. Mfrs.

A low-cost chemical-resistant plastic pump that features:

- No stuffing boxes
- No shaft seals
- No valves or gaskets
- Self-priming
- Non-contaminating
- Non-agitating
- Operates wet or dry

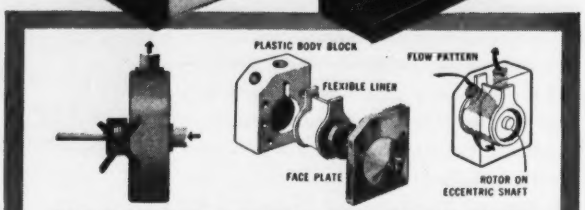


Designed to give complete protection against leakage, corrosion, and maintenance problems.

Available close-coupled (shown here), foot-mounted, face-mounted, or special on request.

This new Vanton pump is designed to provide the equipment manufacturer with a low-cost, versatile, simple yet carefully engineered unit, problem-free with minimum maintenance. Construction materials at present available include PVC, high-temperature polyethylene, Teflon*, Buna N, bakelite, or stainless steel, in capacities from 1/8-10GPM. For information, write for BULLETIN CC10.1.

*Reg. trade mark of E. I. DuPont & Co.



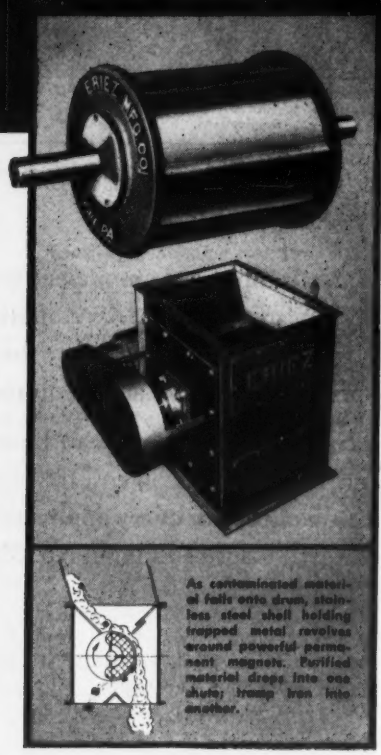
Basic Vanton Design removes the problems associated with stuffing boxes and shaft seals by eliminating the seals themselves. All fluid moves in a channel formed by the outside of a flexible rubber or synthetic liner, and the inside of a molded plastic or stainless block. Liner flanges are sealed as shown against the body block sides by end plates. Pumping mechanism is rotor mounted on eccentric shaft inside liner. At each revolution it creates a progressive squeegee action on the fluid trapped between liner and housing.

VANTON PUMP and Equipment Corp. • Hillside, N. J.
DIVISION OF COOPER ALLOY CORP.

Check 1025 opposite last page

Get increased protection ... new ERIEZ MAGNETIC DRUMS

now up to 50% stronger than old-style drums!



As contaminated material falls onto drum, stainless steel shell holding trapped metal revolves around powerful permanent magnets. Purified material drops into one chute; tramp iron into another.

Costly maintenance problems eliminated with new replaceable Shell and Bearings! Expanded, improved line of permanent magnetic drums invaluable for automatic continuous removal of ferrous contamination from foods, chemicals, grains, plastics, ceramics, rubber, etc.

Stronger, larger, more efficient magnetic elements provide more magnetic power, better protection than ever before possible! New magnetic units trap and remove small and medium iron fines as well as heavier pieces of tramp metal from processing lines. Protect machinery, prevent fires and explosions, eliminate product contamination. Quickly, easily installed at discharge end of gravity flow chutes, spouts, screw conveyors, etc. For wet or dry materials. With or without housings. Peak protection at low cost.

NEW, TIME AND MONEY SAVING FEATURES! *Easy drum removal;* no need to remove housing. *Bearing replacement simplified;* no disassembly of shell required. *Replaceable shell;* excellent for abrasive applications. Stainless steel shell construction won't pit or corrode. *Dust-tight housing;* all steel, welded construction. *Adjustable magnetic element;* magnetic area can be moved to insure peak efficiency for varying sizes of ferrous contamination. *Lifetime guaranteed permanent magnets;* can't fail or burn out. *Continuous efficiency;* unaffected by external conditions. *Wide range of sizes;* standard diameters of 12", 15", & 18", 24" heavy duty diameter. 10 standard widths.

Eriez, pioneer and world's leading producer of magnetic equipment, builds a complete line of separation, vibration and automation units. Our skilled field and lab staffs are always ready to help solve a problem.

For literature or information, write Eriez Mfg. Co., 73JA Magnet Drive, Erie, Pa.

Magnetic SEPARATION AUTOMATION VIBRATION Equipment

ERIEZ HI-POWR MAGNETIC SEPARATORS

ERIEZ

Check 1026 opposite last page

PEOPLE

president — market development.

ROBERT R. PIERCE is named manager of corrosion engineering products department of Pennsalt Chemicals. New sales manager for department is JAMES H. COGSHALL, and ROBERT S. MERCER is made department's manager of development.

The Senate confirms President Eisenhower's appointment of DR. ERNEST H. VOLWILER, chairman of Abbott Laboratories' board of directors, to the Board of the National Science Foundation.

New division v-p at Union Carbide is CORNEILLE O. STROTHER, who is appointed vice president — research of Union Carbide Nuclear Company.

New assistant product sales managers for Du Pont's elastomer chemicals department are NEIL L. CATTON and ALFRED J. NORTHAM. Catton will be responsible for neoprene and Northam for "Hypalon" synthetic rubber.

And at Amoco Chemicals, DR. FRANK G. PEARCE becomes new director of project engineering.

Heyden Newport appoints CLEMENT H. HORST vice president and general manager of company's international division. And at Heyden Newport's American Plastics Corporation subsidiary, ELMER SMITH becomes new sales manager.

"Wilson, . . . we've called you in because we're out of cigarettes . . ."

THAT'S INTERESTING

European tech info

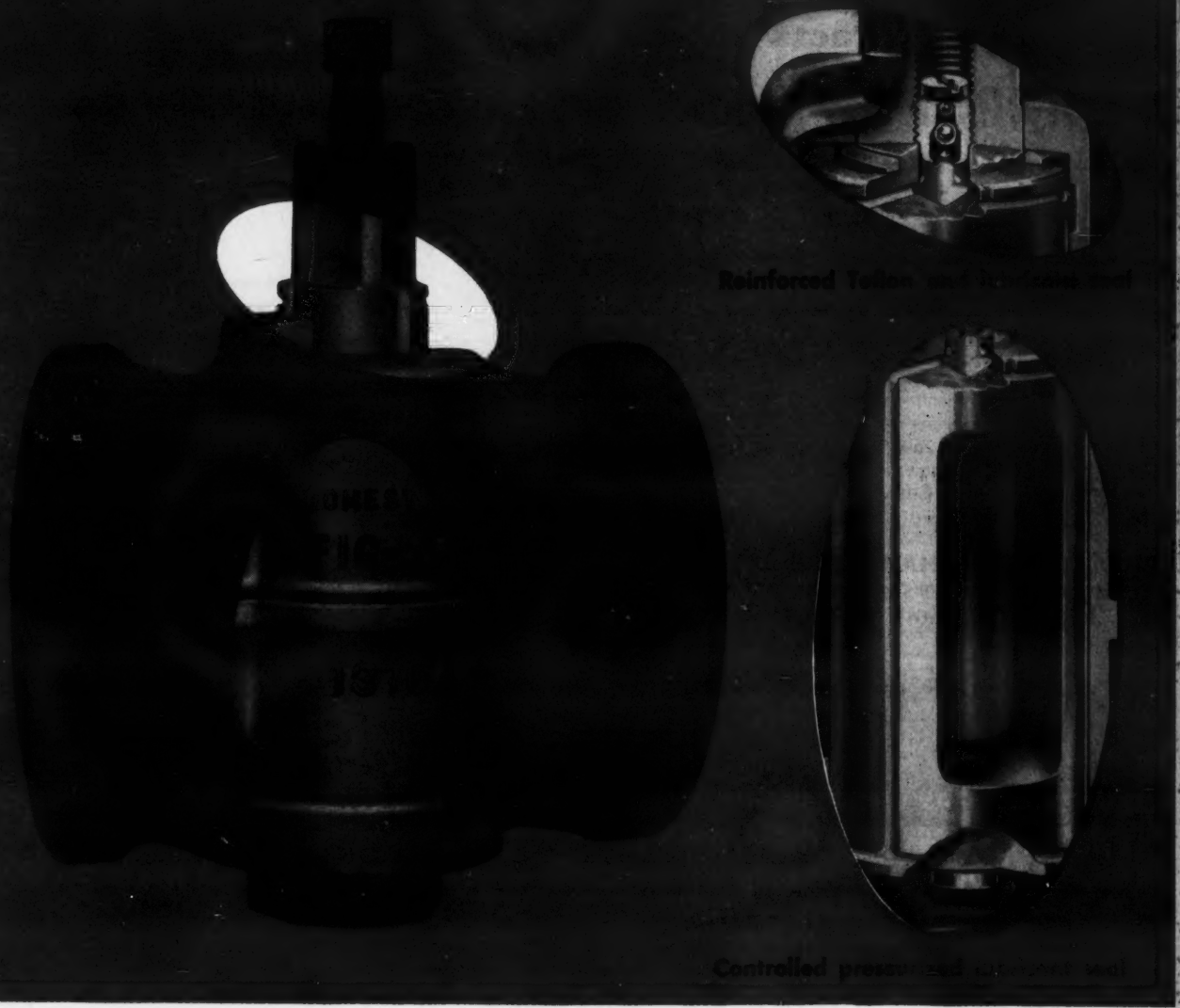
Five-man staff of scientists and engineers covers all of Western Europe visiting plants, laboratories, scientific meetings, trade fairs, and reports current literature, patents, and theses of interest to its sponsors. Based in The Hague, European Technical Observation Group is sponsored by 20 non-competitive American corporations. (*Industrial Research Newsletter,* Armour Research Foundation)

Red, red redwood

Ancient redwood loses its characteristic red color and turns gray when exposed to rain and sunlight. A study is now being made to find a way to treat board siding so that the compounds which impart the distinctive color to redwood are made insoluble. (*SRI Journal,* Stanford Research Institute)

For more information on product at right, specify 1027 see information request blank opposite last page.

LEAKPROOF



Lower cost per year valve service is guaranteed by Homestead Lubricated Plug Valves. These are the features that make them leakproof and extend their useful life . . . reinforced Teflon* head seal, double ball and lubricant sealed check valve, and their exclusive controlled pressurized lubricant seal.

Homestead's controlled lubricating system forces a chemical film over all sealing surfaces at more than 300 pounds pressure. In addition, it prevents sticking, by its piston-like movement of the plug during each lubrication. See how Homestead fills your valve needs. Write today for Reference Book 39, (Section 5), for complete information on Homestead Lubricated Plug Valves.

**DuPont registered trademark.*

h v

HOMESTEAD VALVE MANUFACTURING COMPANY

P. O. Box 140 Coraopolis, Pa.

TOWER PACKING

All the facts about HARSHAW *tellerettes*

Contained in this comprehensive booklet discussing the application of Harshaw Tellerettes to tower packing.

Subjects discussed at length (accompanied by pertinent charts)

1. The Tellerette Shape
2. Physical Characteristics
3. Lower Capital Investment and Operating Cost
4. Low Weight
5. Reduced Tower Height
6. Increased Tower Capacity
7. Support Plates
8. Corrosion Resistance
9. No Clogging

THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
Branches in Principal Cities

Send today for your free copy... Use this convenient coupon!

THE HARSHAW CHEMICAL CO.
1945 EAST 97TH STREET
CLEVELAND 6, OHIO

Please send me _____ copies of your booklet, "Harshaw Tellerette"

Name_____

Company_____

Street Address_____

City_____ Zone_____ State_____

Check 1028 opposite last page

Tax-favored Research

Should "non-profit" research institutes be exempt from taxation? Do they represent unfair, tax-favored competition for the independent laboratory that makes its living by research? Or do they perform a vital service, non-competitive with the independent labs, that taxation would destroy?

On the facing page, Lewis Harris points out the changed activities of the tax-free institutes that have made them tax-favored competition and diverted them from the path for which their tax-exempt status was designed.

On the following page, Dr. Clifford C. Furnas outlines the function of tax-free institutes and tells why saddling them with a tax burden would be a serious threat to our national scientific program.

The editors realize the controversial nature of this subject. But its importance prompts us to bring it forcibly to light.

Perhaps you want to take issue with the viewpoints of Dr. Furnas or Mr. Harris. Why not mail us your comments; those most pertinent will be published. Address: The Editor, CHEMICAL PROCESSING Magazine, 111 East Delaware Place, Chicago 11, Illinois.

Non-profit research institutes are serving as applied research arms of industrial companies. Little basic research is done, and publication of research results is often held back. Is it fair to continue tax "favoritism" to these organizations? Here's what the independent-laboratory men say . . .

APPLIED RESEARCH INSTITUTES SHOULD NOT BE TAX-EXEMPT

LEWIS E. HARRIS, Director
Harris Laboratories

Originally, non-profit research institutes were set up primarily to conduct "basic" or pure research. Thus, they *started* with a high ideal . . . but in a very short time changed to the application of "applied" research, and basic research went into the background. I oppose these outright commercial business enterprises which are camouflaged as so-called institutional and educational organizations and which use such guise to evade taxation.

An even more insidious and potentially dangerous facet of this problem is that by devoting too much attention to applied research in our supposedly non-profit institutes and universities, we are undermining the very basis of our scientific knowledge. As a result, our fund of basic knowledge is drying up. We are becoming a nation which may be at a tremendous disadvantage in this technological age, because our attention is being devoted to applied research when it should be devoted to basic research.

This was brought out most forceably in a publication entitled, "Research and Development by Non-Profit Research Institutes and Commercial Laboratories, 1953". This report was compiled by a group at Syracuse University and was published in 1956 by the National Science Foundation. In the 12 non-profit institutes of the nation, whose total research and development was just over $53 million, only $3-1/3 million was devoted to basic research, or 6% of the research expenditure. That percentage is even less today. It is estimated that the amount of basic research conducted by these institutes is now more nearly 3%, with the total volume being considerably greater than $53 million.

Armour Research Foundation in 1955-56 did a business of nearly $12 million, largely *applied business* research, 12% more than the previous year. Their own publication indicates that of 619 projects in 1956, 13 (less than 2%) were concerned with basic research. The other 98% were pure business research items, the results of which were maintained in a confidential manner not available for public use. Patents were developed to yield commercial gains for private industry.

The Stanford Research Institute in 1956 did $12½ million, applied research business, primarily . . . a 25% gain over the previous year.

Cornell Laboratories, a subsidiary of Cornell University, in the last 11 years has conducted $75 million worth of *applied* research — 1200 projects.

Patents and Publication

Institutes and commercial laboratories rely upon industry for their income, and the character of their research

To page 63

Lewis E. Harris, president of Harris Laboratories, and director Pharmaceutical Div., and member of board of directors, Norden Laboratories, Lincoln, Nebraska, is a past president of the Nebraska Chemical Society and an executive board member of the American Association of Bioanalysts. Currently acting as chairman, Committee on Legislation and Tax-Favored Competition, American Council of Independent Laboratories, he speaks not only for his own interests but those of the council as well.

Dr. Clifford Furnas defends tax exemption on next page

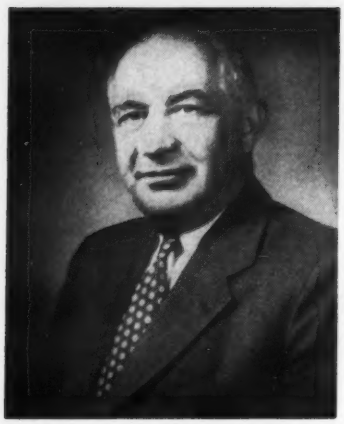
Basic and Applied Research Defined

Basic Research, or "pure" research, is devoted to the exploration and development of fundamental knowledge regardless of type and with no thought of exploitation of such research. The results of basic research are (or should be) freely and immediately published for the benefit of the public.

Applied Research, or business research, is defined as the systematic application of basic research knowledge to the commercial development of anything which may now or later have commercial value. The results of applied research are almost always confidential and *not* published until the sponsor has had an opportunity to capitalize on his research cost and advantages.

Science is not an activity which can be segmented and compartmented. Earnings of non-profit institutions are plowed back into exploratory research by members of the staff. This results in highly selected "seed corn" essential for the next crop of new ideas and scientific findings. Taxation would, in effect, hobble the horse we're betting on to win the race. A representative of the institutes says . . .

TAXATION – A BARRIER IN THE WAY OF SCIENTIFIC PROGRESS



Dr. Clifford C. Furnas has been associated with research activities both profit and non-profit since the early days of his career. He served three years as director of research for The Airplane Div. of Curtiss-Wright Corp., and eight years as director and executive vice president of Cornell Aeronautical Laboratory, Inc., a not-for-profit organization. From Dec. 1955 to Feb. 1957 he served as Assistant Secretary of Defense for Research and Development. As chancellor of the University of Buffalo, he heads an institution which engages continuously in varied scientific activities in addition to academic instruction.

Lewis Harris attacks tax exemption on preceding page

DR. CLIFFORD C. FURNAS, Chancellor
University of Buffalo

Proponents of changed legislation wish to remove tax-exempt status from any scientific organization if it engages in any scientific activity other than "basic" research. Such an attitude represents a most grievous and serious error in concept and philosophy, and can lead to dangerous results.

Science is not an activity which can be segmented and compartmented. To limit the progress of science by any arbitrary distinctions between "basic" and "applied" work would be to choke the child while it was still a-borning. Many of the most essential contributions to human welfare have been realized only when scientific efforts have been pursued well into the practical applications.

The necessary core activities and continuing stimulus for both basic and applied phases of radar, the proximity fuse, and the atomic bomb came from a handful of universities and non-profit research organizations. Had arbitrary barriers based on tax considerations been put in the way of these organizations, their work would not have been completed in time. To put bars or brakes in the path of scientific progress is far from being in the public interest.

It is necessary to understand the pattern of support and methods of research operations of the universities, research institutes, and non-profit laboratories. These have changed most radically during the past quarter century.

For the non-profit, non-government scientific organization the bulk of research support now comes from contracts and grants with the purpose of support being specified to varying degrees. So long as the institution is under no direct compulsion to earn a profit it may excercise independent selection among a broad range of such contracts. It remains free of undue restriction on the course of its work. This is necessary to retain maximum freedom of individual initiative.

Earnings are customarily plowed back into further untrammeled, exploratory scientific research by members of the staff. This is a most important factor in the motivation and searching drive of scientists. The results of such research represent essentially highly selected "seed corn," which though small in proportion to the total yield, is essential for the production of the next crop of new ideas and scientific findings. This seed corn represents an investment of time and effort which over a few years yields many fold.

The National scientific program will quickly wither without these new ideas and findings. If all, or even a portion, of the always meager net earnings from such non-profit institutions were withheld for tax purposes, or if they were barred from tax-free corporate and individual grants, one of the most potent sources of advance on the part of many of the nation's most gifted scientists would be throttled.

Increasing Competition

For the self-sustaining, non-profit institutions the duality of support is as necessary as the duality of a basic-plus-applied program. A program completely isolated from the broader base of applied research would often be so restrictive and stultifying that many of the best scientists would choose to work elsewhere. This could be a grievous national loss.

Broadly speaking, the two types of research institutions, profit-making and non-profit, are so different in their character and purpose that there is little if any competition between them. Naturally there is some overlapping and certainly one could find instances where, judged by the narrow application of rigid criteria, some projects might be considered to be competitive. But the percentage is small and the danger involved in trying to weed out these few exceptions would be very great.

To bottom of page 48

A CHEMICAL BUSINESS *Profile...*

Wyandotte builds 'new personality' with Geismar

When Wyandotte Chemicals formally opened its new Geismar (La.) Works a few weeks ago*, the event took on far more significance for the company — and for the chemical industry — than just another plant opening might. To Wyandotte, Geismar represents a number of things, all the culmination of something like seven years of face-lifting, of the reorganization and rebuilding of a company that just a few years ago was regarded as little more than a regional operation.

In a very real way, Geismar is a big move, even a big gamble for Wyandotte. A $37-million expansion for a company with a net worth of only $87 million is roughly equivalent to a Du Pont expansion outlay of over $1.5 billion in a similar period. (For purposes of comparison, Du Pont actually spent about $220 million for new or improved facilities last year.)

But big gambles offer big stakes, and Geismar seems well on the way toward paying off. Before the first pound of ethylene oxide or ethylene glycol was produced, the entire output for 1958 and well into 1959 was committed. And indications are that when the plant's chlorine/caustic unit goes on stream early next year the general industrial economic pattern will be improving to an extent that there will be markets for the plant's output. (Soda ash is the only large-scale Wyandotte bulk chemical not to be produced at Geismar.)

And Geismar may well pay off in another way too. Wyandotte is probably in on the ground floor of what could turn into one of the biggest US chemical complexes in the next few years. Bill Zeckendorf, of real estate development fame and certainly no slouch when it comes to property forecasting, predicts that the entire Mississippi River front between Baton Rouge and New Orleans will be crowded with chemical plants in the next ten years. Geismar is smack in the middle of the strip, and Wyandotte's 1200-acre plot is exceptionally well suited for some customers' satellite operations.

Two Major Steps

Geismar represents two other major steps for the company — one fairly obvious, and the other somewhat couched in President Robert B. Semple's predictions for the future.

The obvious point is the advantageous marketing position the plant creates for Wyandotte. Although the company has never really been a regional operation by any means, it has been rather limited in its marketing areas. Marketing of large-volume bulk chemicals will always be dictated primarily by shipping costs to the various markets, and Wyandotte's northern location — just outside Detroit — has seriously hampered selling in some areas. The new location will permit competitive selling over almost entire US.

(This applies only to the Michigan Alkali division selling ethylene oxide and glycol, chlorine/caustic, and soda ash. The J. B. Ford division has a nation-wide marketing organization.)

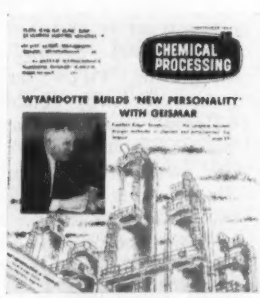
But the real significance of the new plant lies in Semple's views of the company's future. "Barring an unexpected acquisition — and of course we're always on the lookout for something advantageous — our expansion pattern will almost certainly be one of development of our existing direction," he explains. "Our future will grow from our present pattern — in our basic type of chemistry."

This will probably be the case; but there's more to the statement than might at first meet the eye. While the Geismar plant will involve no new products or lines — except, perhaps, some additional ethylene polymers — it involves a wholly new "type" of chemistry, both in terms of process and, more important, of the business.

Although ethylene oxide is certainly a petrochemical, Wyandotte's oxide unit at one of its Michigan plants doesn't really qualify as a petrochemical operation as we use the term. In 1948 the company's first oxide and glycol plant went on stream, but it used the old chlorohydrin process, and existed largely because of the company's raw materials position in chlorine — and not as a petrochemical venture.

(Wyandotte's chlorohydrin process starts with crude oil, from which an ethylene stream is produced and chlorine and water are reacted

To page 45



COVER STORY

**For a story on plant operations at Geismar see page 51.*

Last month (page 29), CHEMICAL PROCESSING and Mr. Alan McCone (shown here), assistant to the president of Catalytic Construction Company, revealed how contract maintenance has brought savings to the chemical processing industries. Results at two refineries — Tidewater Oil and Sun Oil — were used as examples.
This month, we conclude by looking at types of contracts, integration of work forces, and union aspects.

Why Contract Maintenance? —part 2

Q — — Mr. McCone, you stated it was Catalytic Construction Company's conviction that the more completely contract maintenance services are employed, the greater are the potential savings for manufacturers. How is this possible?

A — — First of all, let's examine the various degree to which contracts for general plant maintenance may be obtained. These may be divided into four categories ranging from simple labor-supply to a complete service, all of which have the principal advantages of: a) a flexible work force as required; b) utilization of mechanics with recognized qualifications that are available in the AFL building trades unions; c) no effect on owner's unemployment insurance rates by turn-overs in contract maintenance forces; and d) specific advantages to the owner in areas of public relations, labor relations, and personnel administration.

The first category — that of the labor-supply contract — is now in rather general use in the process industries. It is used to meet peak manpower requirements. This method is certainly preferable to short-term hiring at the gate on the owner's payroll.

A disadvantage of this type of contract — and it is a major one — is the problem of integrating this temporary force efficiently (which has different wage rates and conditions of employment) with the owner's permanent force. Since in this case the contractor is only a hiring agency, he does not provide a supervisory staff familiar with the plant equipment.

The second type of contract provides services for a defined turnaround of a plant or unit. This service may eliminate the necessity of integrating plant forces with the contractor's temporary force.

While the contractor provides shift and craft supervisors, planning and coordination of the turnaround have to be done by the owner's staff. A complete duplication of the contractor's top organization is necessary to insure that testing, inspection, and repair are accomplished properly.

The third type of maintenance contract is based on a limited but permanent contractor's force supplementing the owner's maintenance organization. Under this arrangement the engineering, planning, and coordination to a major extent are performed by owner's personnel.

The contractor will maintain a staff consisting principally of craft supervisors and a labor force estimated to meet normal requirements when added to owner's permanent maintenance forces. Under this arrangement, peak requirements are met by adding to contractor's force.

This type of contract has advantage of the labor-supply contracts in providing flexibility and limiting owner's liability. It also permits the contractor's permanent staff to become familiar with plant equipment and personnel.

The procedure, however, falls short of the provisions of complete contract maintenance service in that the owner still has many of the responsibilities and liabilities associated with a substantial part of the maintenance force. In order to achieve flexibility, the contractor's staff is duplicated to a degree by owner's staff.

The fourth type of maintenance service is that in which the basic responsibility for planning, coordination, and supervision of work in the field is vested in a competent contractor. Under such a contract, the owner requires only enough maintenance staff to coordinate the requirements of the management and operating staff with the contractor's principal representatives. All the advantages of direct management by the owner's personnel can be preserved.

Additional advantages are a flexible supply of experienced maintenance specialists under a field supervisory staff familiar with the plant equipment, utilization of mechanics of a high degree of special skills, and complete flexibility in the staff as well as in the work force.

Q — Isn't it possible that a regular plant maintenance force employed by the owner will be better skilled for that particular plant's purposes?

A — It may possibly be true that mechanics with long periods of service in a particular plant may have greater knowledge with respect to certain pieces of equipment. However, this is far from universally true. In most plants it is the custom to fill vacancies requiring higher skills by posting the job and making selections from the forces with lower classifications.

Unquestionably, certain skills or aptitudes are given consideration in any such system of selection. However, a good willing worker may find himself working as an electrician, a pipefitter, a boilermaker, or a machinist, depending on which opening was posted first when he was considered for up-grading from the labor gang.

In contrast to this, the craftsmen available through the building trades unions are specially skilled in their field.

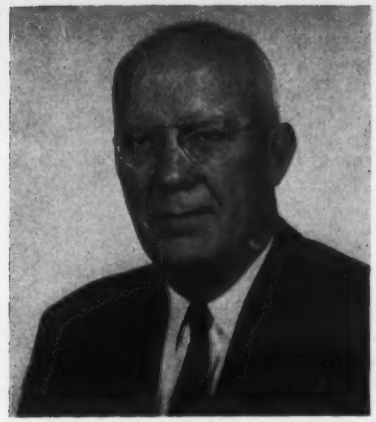
This is not to say that there is a uniform level of competence, but the contractor is at complete liberty to eliminate those who do not meet reasonable standard of performance and request that competent replacements be furnished.

The prospect of regular employment near home has made contract maintenance work the prize job for construction workers. This makes it possible to hire and hold the unions' best mechanics.

Q — Doesn't this higher skilled "outside" mechanic cost the owner more than the up-graded company man?

A — in the matter of relative cost per manhour of owner's force compared to the con-

To bottom of page 65



Harold Knowlton Work has been associated with both industrial and academic research throughout his career. After finishing a research fellowship at Mellon Institute in 1929, he joined Aluminum Company of America as division head in the research laboratories. From 1936 to 1949 he was manager of research and development and, finally, director of research at Jones and Laughlin Steel Corp. In 1949, he joined New York University as director of College of Engineering, Research Division.
Dr. Work's education includes AB and chemical engineering degrees from Columbia University, and PhD from University of Pittsburgh. Ideas presented in this article are some of those that Dr. Work presented last fall at the President's Conference on Small Business.

How does the small businessman do research? He can't do it on the same scale as large business, but he can take advantage of some of the research services available to large businesses. Harold K. Work of New York University, one who has worked long with small business on research problems, points out ways for . . .

Solving Research Problems of Small Business

HAROLD K. WORK, Director
Research Division, College of Engineering
New York University

It is not possible to say categorically that all small industry* needs more research. But, the belief exists that, by and large, small industry does need help in science and technology. It has been said that only 10 percent of small businesses have their own research facilities and that only 20 percent support research at all (except indirectly through taxes).

Part of this is due to the fact that research presents problems when one tries to scale it down to small sizes. Funds available for research are restricted at their source. Figures show that 95 percent of all U. S. companies each do an amount of business less than $500,000 per year. If these companies wish to do research at the same rate as larger companies, they will spend 2½ percent of sales on research.

This will give not over $12,500 per year — barely enough to support one research worker. This can hardly generate a very comprehensive research program.

*As defined by Government procurement offices, a business enterprise with fewer than 500 employees is not considered small if dominant in field of operation. Also, a relatively small business enterprise primarily engaged in an industry characterized by large number of employees may be certified as small business even if it has more than 500 employees.

Co-op Research

One solution is for small companies having common research problems to go together and submit their problems to a university or research agency. This has the advantage of bringing research benefits to the small company at a reasonable cost.

However, it has the disadvantage that no one company can gain an advantage over its competitors represented in the group. It is not the complete answer for the small businessman who wants to make maximum progress.

To add to these economic problems, there are other problems causing a lack of understanding between the university people and the small business people. The small businessman lacks understanding of the nature of research.

Large numbers of research investigations are made, but only a few of them are big money makers. Research is basically a speculation. Big business has learned this and has a clearer understanding of this problem. Consequently, they know how to use research and work harmoniously with the research agency or university.

Small business, on the other hand, tends to feel that if it makes an investment in research it is entitled to huge profits in return. Well, why shouldn't they? Everyone talks of the great commercial value of research.

In our own institution most of our industrial research is for large companies. Only about 20 percent of the projects are for small companies. There is good reason to believe, however, that the small company, if experienced in the handling of research, can make excellent use of sponsored research facilities of a university.

On the other hand, because of the problems mentioned so far, and in spite of some spectacular successes of sponsored research in universities, there are those who feel the university, for the most part, is not the place to resolve the research problems of small business.

What Is Research?

This brings up a very interesting question of just what constitutes a research project. We feel that research is a long-range operation. Large companies deeply involved in research also seem to draw a size line. The short-term projects are generally handled by the plant technical departments and are not called research.

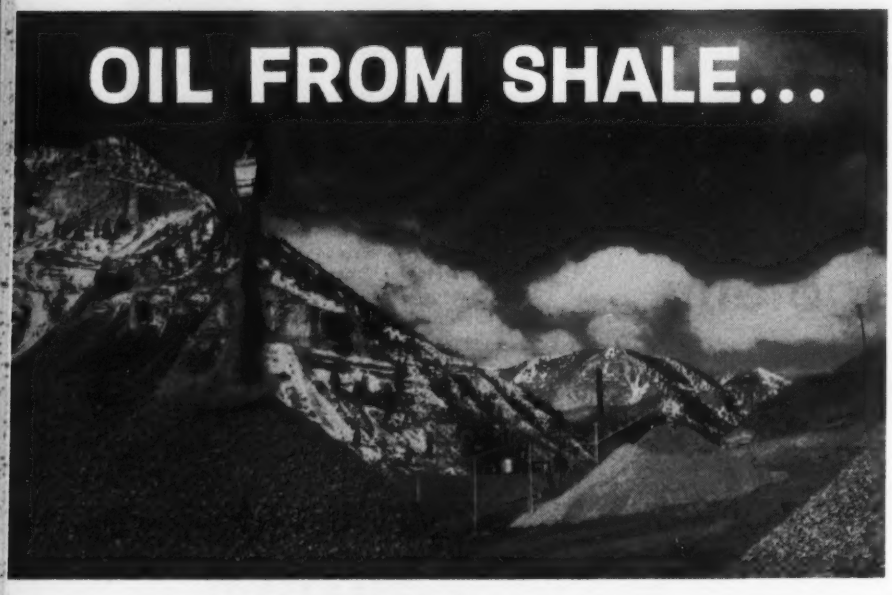
To bottom of page 68

Over one trillion barrels of shale oil are locked within the oil shale rock reserves of northwest Colorado. This is equivalent to more than five times the entire proved crude petroleum reserves of the free world, and more than 40 times those of our country.

For more than three years, Union Oil Company of California engaged in an extensive research program — involving the expenditure of more than $9 million of non-subsidized private funds — seeking to unlock secrets of extracting this oil. The study produced significant technological answers. A numer of non-technological factors now remain to be considered.

The executive in charge of this vast research project is Fred Hartley, Union Oil vice president for research. CHEMICAL PROCESSING interviewed him to get a progress report on —

OIL FROM SHALE... coming source of energy



From mines high in the Colorado Rockies, crushed oil shale rock is brought by aerial tram to storage area, prior to retorting to extract the shale oil

FRED L. HARTLEY, vice president for research at Union Oil Company of California's $9-million Research Center near Los Angeles, has been with the company since 1939.

He has directed Union Oil's comprehensive research and development program since its inception at the beginning of 1955. In the summer of 1955, Hartley spent seven weeks in Europe studying oil shale experiments and operations in Scotland, Germany, and Sweden.

In 1956, he was elected a vice president, and currently heads a research team of 500.

Hartley served as president of the California Natural Gasoline Association in 1953, and is now a director. He is an active member of the American Institute of Chemical Engineers and the American Petroleum Institute. He graduated from the University of British Columbia.

CP — Mr. Hartley, how does shale-derived oil differ from ordinary crude?

HARTLEY — As far as the raw shale oil itself, it has much in common with petroleum-derived crude oil. The main difference is that it is a solid at room temperatures because of its wax content and that it contains quite a number of nitrogen-containing organic compounds.

Most crude oils contain these compounds, it's a matter of degree. However, after the completion of all necessary refining steps, finished products derived from shale are indistinguishable from their natural petroleum counterparts.

CP — Then why does obtaining shale oil present different problems from those in obtaining crude oil?

Hartley — Both crude oil and natural gas exist in the ground in the liquid and gas phase, separately from their rock, or sand, formations. Shale oil does not. In the ground, it exists as a solid, called "kerogen," that is combined with the rock.

Shale oil can be separated from this oil-bearing rock only by using heat.

The ore must be mined, crushed, and roasted, or "retorted" we call it, to recover the raw shale oil. This operation is comparable to the roasting of mercury ores to obtain the liquid metal.

CP — How much ore must be mined in order to produce one barrel of raw shale oil?

Hartley — In our operations at Grand Valley, Colorado, we retorted from 1¼ to 2½ tons of oil shale for each 42-gallon barrel of shale oil we recovered. This range results from the fact that oil shale varies considerably in oil content.

CP — Where can production costs be shaved in order to make shale oil economically feasible?

Hartley — There are three areas where costs can be shaved: The first is in mining, second in retorting, and the third is refining the raw shale oil. It is also essential that we obtain a ruling from the U.S. Government that would place the tax allowance for depleting our resources on the same basis as that allowed to the petroleum and natural gas industries. This would give shale oil producers equivalent tax treatment.

CP — In which cost-cutting areas have you worked?

Hartley — All three. Our Shale Demonstration Plant at Grand Valley showed that we can reduce the cost of retorting shale to less than one dollar per barrel. May I emphasize that this is the retorting cost only and does not include mining and refining.

Our mining research program included the development of an underground experimental mine, which permitted investigation of the most advanced mining techniques and procedures. Oil shale is about four times as tough to break as is solid concrete. Exploration and mining are costly and risky. Additional products made available by retorting and refining include — retort gas, nitrogen compounds for fertilizers, and shale coke which is of a

Union Oil Company shut down oil shale mining and retorting operations and deactivated its Shale Demonstration Plant on August 1, to shift research emphasis to cost and design studies.

Company states: "Preliminary figures indicate that our costs, on basis of 25,000-bpd plant, delivering semi-refined products to the Pacific Coast or comparable areas, compare favorably with similar products made from natural crudes at prices presently posted in those areas for such crudes. It must be pointed out, however, that in many cases crude oil is selling today at less than posted prices. Under normal conditions this would mean we are nearing competitive costs.

". . . the Company is in a position to produce shale oil and its products for armed forces and civilian use under a 'crash program' if foreign oil is shut off by such incidents as the Suez crisis or a political disturbance in the Middle East. All the time needed would be for steel fabrication and assembly of plants and pipelines."

high grade, and offers possibilities for use in electrodes.

We do not consider these to be by-products but, instead, an integral part of the overall manufacturing operation. Certainly no one considers natural gas to be a by-product of crude oil production. In fact, it is becoming more difficult yearly to say which is the more important, considering the marketing outlets for gas and oil.

CP — What have you found from your refining studies?

Hartley — Our first finding was that refining of shale oil can be accomplished by processes which are used today in many crude oil refineries. Plant designs would be specific to shale oil processing objectives. We overcame the problem of raw shale oil's gelling up at temperatures below 90°F by running the oil through a standard delayed coking unit. This cuts the pour point to about 30°F, and makes the oil suitable for pipeline movement.

After the pass through the delayed coking unit, the oil is "Unifined," using a catalyst in the presence of hydrogen. "Unifining" converts the nitrogen in the oil to ammonia and the sulfur in the oil to hydrogen sulfide, both of which are recovered. The result is "commercial-grade" shale oil, which is superior to many of the "conventional" crude oils.

CP — How about equipment?

Hartley — As far as equipment for retorting the oil from the oil-bearing shale rock, we have developed a simple and reliable retort. We feed the rock into the bottom of the retort, move it up through the retort with a large ram-like piston, and take the ash out of the top of the retort. The oil and gas leave the retort just above the rock feed entry.

Our retort, placed in operation during March 1957, reached its design rate of 360 tons/day by early summer. Throughput rates in excess of 1000 tons of rock per day, on fully automatic operation, were achieved during the retorting program.

As far as the delayed coking unit and the hydrogenation, or "Unifining", unit just mentioned — these are established process units presently found in dozens of refineries throughout the world. Specific designs for shale oil would be employed.

CP — Isn't the fact that shale oil reserves are within the continental U.S. an important factor?

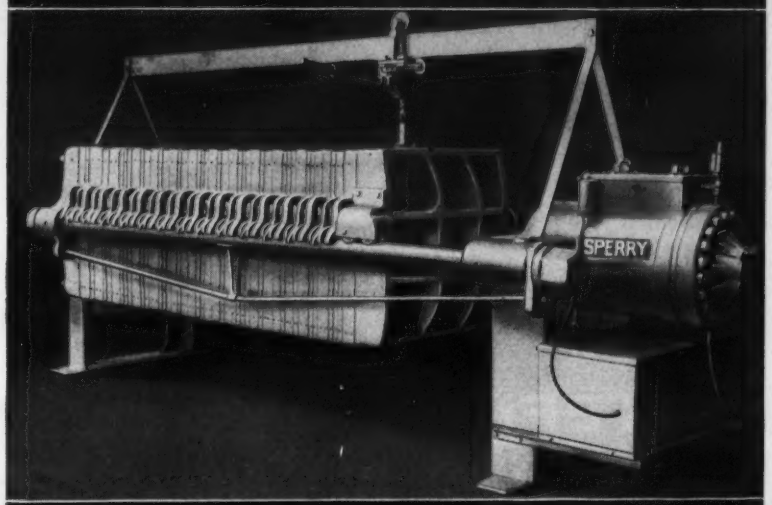
Hartley — We believe so: Proved oil shale reserves are equivalent to over 40 times our domestic crude petroleum reserves, which we know cannot last forever.

Reliable U.S.-controlled sources of strategically important liquid hydrocarbons are essential for a country which wishes to keep its fighting and economic strength independent from events aboard, such as the recent Iraq uprising. Oil derived from shale can provide this much-needed long-range domestic source.

CP — How about the depletion allowance angle? What can be changed?

Hartley — As the tax law stands at present, depletion allowance is only allowed on the value of oil shale rock at

LOW DOWNTIME



with a plate and frame
SPERRY FILTER PRESS

If your present filter system is inadequate to meet increased production demands . . . if excessive shutdowns, cleaning and manpower problems are dragging out your filter cycle so as to slow down your production cycle — now is the time to investigate all the advantages of a plate and frame filter press — as modernized and custom engineered to your particular application by D. R. Sperry & Company.

Through extreme versatility of design, a Sperry Filter Press can simplify the most complex filtration requirements. Varying batch sizes . . . incompatible products . . . cake removal . . . and constant cleaning cease to be problems. Instead — the cycle is reduced . . . filtering area and pressures are increased . . . downtime losses are reduced to a minimum . . . and with labor-saving automatic closing attachments and plate shifting devices, complete control is reduced to a one man operation.

Sperry Filter Presses are available in a design and capacity to handle any filterable mixture and any filter material . . . with center, side or corner feed; open or closed delivery; high or low temperature control; and your choice of labor saving devices.

FOR A LOW-COST ANSWER TO YOUR FILTRATION PROBLEMS, SEE THIS SPERRY CATALOG . . .
an up-to-date fully illustrated reference manual of erection, operating, design and construction data and specifications. Mail coupon for your free copy today.

D. R. SPERRY & CO.,
BATAVIA, ILLINOIS
Representatives in Principal Cities

SEE OUR EXHIBIT
10th
national chemical exposition

Visit Our Booth 76.

D. R. SPERRY & COMPANY
Batavia, Illinois
☐ Send Free Sperry Catalog Dept. CP-9
☐ Have your Representative Contact us
Name_____
Company_____
Address_____
City_____ State_____

Check 1029 opposite last page

Another "Quality Controlled" application of Teflon by Doré

TEFLON* LINED PIPE By DORE

The Teflon lining is tough, dense, smooth...free of holes... has no welds.

For the finest in pipe and fittings lined with Teflon, specify Doré. The pure white Teflon liner is extruded by a special process, and the ends flared under precise control to form the flange face seals without pull-down or overstraining, thus preventing cracks or seams in the lining or seals.

The Teflon seals covering the entire raised face of the flange are perfectly flat and smooth . . . not wavy and eliminate the use of an extra flange gasket. When made-up the flanges have a Teflon-to-Teflon seal to provide continuous Teflon lining through the entire length of piping.

Pipe is Schedule 40 carbon steel with welded steel flanges drilled for 150 psi. The Teflon liner is 1/8" thick.

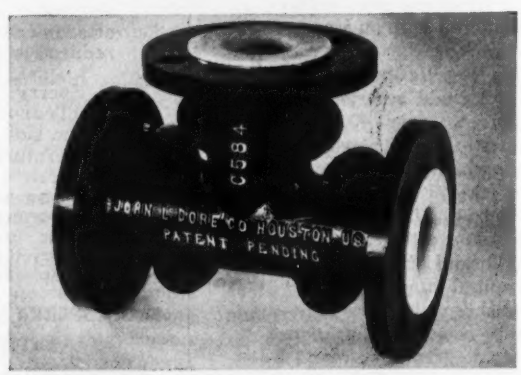
RATINGS: Pressure 400 psi.; Vacuum full; temperature -90°F. to 500°F.

SIZES: 1" through 6", lengths to 10 ft.

For complete details on Doré pipe and fittings lined with Teflon write for Bulletin K-57-A.

*DuPont's registered Trademark for fluorocarbon resins, including tetrafluoroethylene resins.

Doré ductile iron Ells lined with Teflon have a one-piece liner molded to shape. Available in sizes 1" through 6". (PAT. PEND.)



Doré ductile iron Tees lined with Teflon have standard face to C/L dimensions. Available in sizes 1" through 6".

John L. Doré Co.

5406 SCHULER • P. O. BOX 7772 • HOUSTON 7, TEXAS

EXPORT 1505 RACE ST. • PHILADELPHIA 2, PA. U. S. A.

CABLE ADDRESS DOREX

SALES ENGINEERS FOR JOHN L. DORE, INC.

DU PONT'S TEFLON HI-QUALITY NYLON

Check 1030 opposite last page

the mine. Since there is no market for rock, there really is no value from a depletion viewpoint. Not until crushing and retorting have been accomplished do you have marketable products. The allowance should be on the value of the liquid oil and retort gas as they are produced from the retort.

It is important to recognize that this potential new industry cannot come into being unless present oil and gas tax depletion allowances are applied in an equivalent manner to shale oil. We feel very strongly that this must be done, for the current depletion allowance on the rock means nothing.

CP — Is anything being done to change the law?

Hartley — Legislation is now pending that would extend the 27½ percent tax depletion allowance, now permitted for the petroleum and natural gas industries, to shale oil products derived from retorting.

Secretary of the Interior Fred Seaton has asked Congress to enact legislation granting a 27½% depletion allowance for oil shale, coal, and other natural deposits when they are used as a source of synthetic liquid fuels.

Seaton stated, "In the not-distant future, this nation will depend, in part, upon the production and use of synthetic liquid fuels, in view of the continuing trend to increased mechanization of our military establishment and of the expanding economy."

CP — Would a change in the ruling make shale oil competitive immediately, or would this be a stimulus that would bring about a competitive industry much quicker?

Hartley — The proposed change in depletion allowance would serve as an important stimulus to shale research by private industry. The establishment of a competitive shale oil industry would only be possible if equivalent tax treatment were available and total operating costs were low enough to permit a reasonable profit on the large investments involved.

ACS meeting, show held in Chicago

The Tenth National Chemical Exposition, sponsored by the ACS Chicago Section, will be held concurrently with the 134th national meeting in Chicago from September 7 to 12.

Some 100 commercial exhibits are slated for the Exposition, along with a large group of special displays. A model atomic power plant, a working model reactor, missiles, jet engines, and solar displays will be featured.

An interesting facet of the show will be an exhibit of art work by chemists and chemical engineers. A special feature of the Exposition, Trail Blazers of Chemistry, consists of about 50 display panels on which the individual scientist and research teams relate the story of their latest accomplishments prior to commercial development and use. These displays will cover new products and methods applicable to the nuclear age, plus current work of scientists from leading health institutes and laboratories in combating such fatal diseases as cancer and leukemia.

Sidelights of the Exposition are excursion trips to chemical plants in the Chicago area, and an employment clearing house, which will be set up in the Morrison Hotel.

The more than 14,000 chemists and chemical engineers from all parts of the United States and several foreign countries will take part in symposia on new developments in science education, advances in control of air pollution, and progress in the chemical attack on cancer.

Winners of the Priestley Medal, the James T. Grady Medal for distinguished reporting of chemical progress, and the Garvan Medal to the outstanding woman chemist of the year will be announced at the general assembly of the Society on the evening of September 8, in the Conrad Hilton Hotel. Thirteen $1000 prizes to leaders in the various fields of chemical science and industry will also be announced at that time.

No different on the outside, BUT . . .

The pipe lined with a TEFLON TFE-fluorocarbon resin will outlast all others in handling corrosives

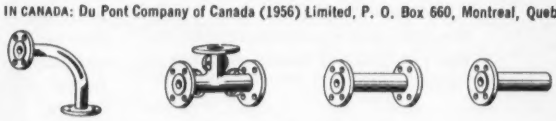
Here's how you can end costly pipe replacement and process shutdown . . . install pipe lined with a TEFLON TFE-fluorocarbon resin. Because TFE-fluorocarbon resins are inert to practically every known chemical, pipe lined with TFE resin stands up, even in the most corrosive services.

For example, one chemical plant installed pipe lined with TEFLON TFE-fluorocarbon resin in a service which involved exposure to boron trifluoride, hydrofluoric acid and organic acids at temperatures above 325°F. After five months of use, the pipe was inspected and found to be essentially unaffected by the rugged treatment. This proved that substantial savings could be achieved from reduced maintenance and downtime. The company also found that, because the ends of the liner are flared over the flanges, no additional gasketing was required.

Pipe linings made of TEFLON TFE-fluorocarbon resins have many other advantages. They won't shatter under vibration, or physical or thermal shock, like brittle linings. They can be used at temperatures up to 500°F. Their nonadhesive properties solve cross-contamination problems. And you can now get a complete assortment of standard sizes of flanged pipe and fittings, including tees, elbows and reducers.

For greatly extended service life in chemical services, install pipe lined with TEFLON TFE-fluorocarbon resin. Check with your local supplier for the details, or, for additional technical data, write to **E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room 99, Du Pont Building, Wilmington 98, Delaware.**

IN CANADA: Du Pont Company of Canada (1956) Limited, P. O. Box 660, Montreal, Quebec

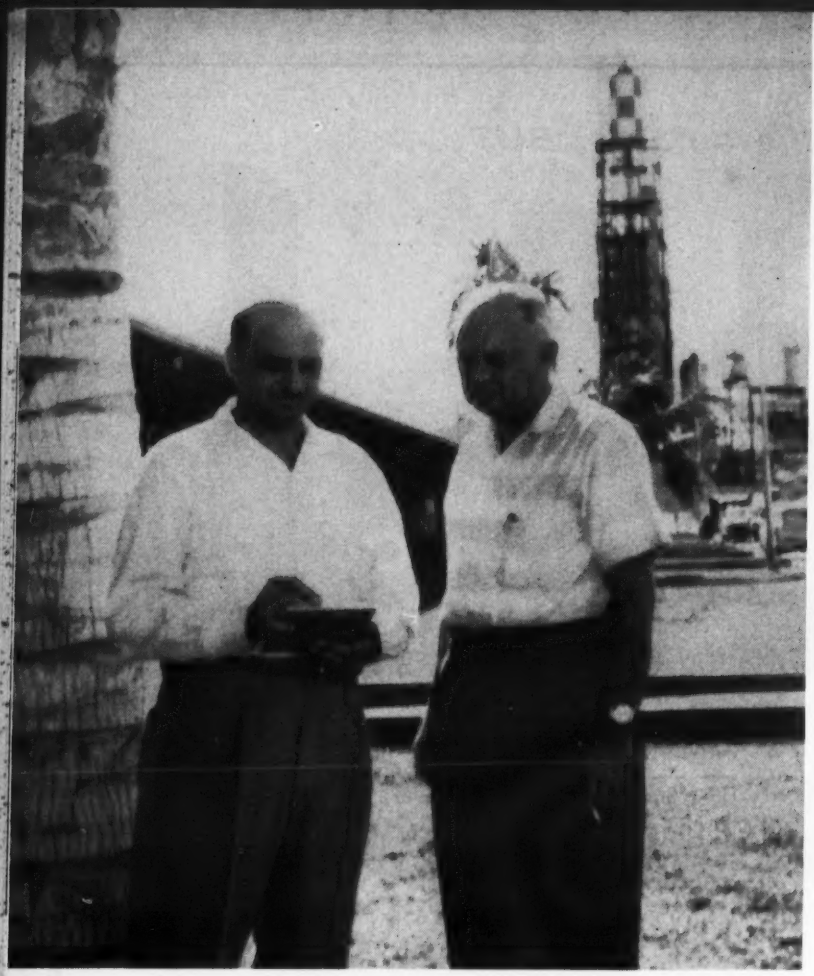


DU PONT REG. U.S. PAT. OFF. **TEFLON®** TFE-FLUOROCARBON RESINS

TEFLON is Du Pont's registered trademark for its fluorocarbon resins, including the TFE (tetrafluoroethylene) resins discussed herein.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Check 1031 opposite last page



President Roy Diwoky and refinery manager D. R. McConnohie of Commonwealth Oil Refining Company, Inc.

This eye-witness account is the result of a fact-finding tour of the sunny island Commonwealth of Puerto Rico. The object: to find out first-hand how good much-talked-about Puerto Rico is as a place for locating chemical processing plants.

What was found from talks with industrial management, economists, and investors is now revealed in —

'Inside' Puerto Rico — new U.S. chemical complex?

CHEMICAL PROCESSING
Staff Report

Puerto Rico is a self-governing sun-soaked island Commonwealth, associated with the United States. It is situated about 1600 miles southeast of New York City. In size, it is 100 by 35 miles — as long as New York's Long Island and twice the width. Puerto Rico's population density, however, is far greater than most states in the U.S.

The 3435-square-mile island has a booming 2¼-million population . . . an agricultural economy alone cannot support it. This combination of facts lies behind the island's government-encouraged industrial boom now taking place there.

'Operation Bootstrap'

Toward the close of World War II, the insular government embarked on agricultural reform and industrial development programs in order to pull up the economy of the island by its bootstraps. Hence, the development program was dubbed "Operation Bootstrap."

At first the government tried to go into business itself by building what it deemed to be "necessary industry." It soon found out that this type of socialism wasn't the most efficient way to industrialize. So it sold the plants to private enterprise and in 1947 launched itself on a program to court and encourage private industrial investment.

The government's main attraction to industry is a tempting ten-year exemption from commonwealth income and property taxes. Since there are no U.S. federal income taxes in force in Puerto Rico, this means virtually no taxation whatsoever. (The offer expires in December 1963, so don't take too long to decide. It is probable, however, that tax exemption will be extended beyond this date.)

Over 500 plants, averaging $650,000 investment each, have set up shop as a result of this.* About half of the plants are making and finishing textile products. Considering investment, not number of plants, the chemical processing industries have by far the largest total investment.

Chemical industries already located on the island find that it is a very favorable location for utilizing resources found in the area and selling the products locally and in Europe, Africa, and the southern U.S. In fact, last year, shipments to the states were running 17% ahead of 1956.

There's another big advantage. Lower cost labor.

The higher the ratio of labor cost to capital investment, the more important this factor becomes.

Take the island's 44 plastics fabricators for example. Polyester resins are sold on the island at mainland prices. (Others are slightly higher.) Finished products are light-weight, compact, and easily shipped at low cost.

Result? Some of these operations are returning their original

**And the pace is quickening. During the first three months of 1958, only three U. S. manufacturers announced plants in Puerto Rico. But this number jumped to 34 for the period of April through mid-June. Companies now are signing up for island installations at rate of one every two business days. In fiscal 1958-59, which began July 1st, Puerto Rico expects to promote a record harvest of 200 "Operation Bootstrap" plants.*

Interestingly enough, Puerto Rico has been a good barometer for the U.S. economy. The Island boom would seem to indicate that the current U.S. recession may be fading.

President Louis R. Gonzalez of Gonzalez Chemical Industries, Inc.

equity investment within three years — and this is on profits, *after* deductions for depreciation and other costs.

Other chemical industries are there too. Net profits to sales average 30% for the island's 39 chemical plants.

There are over a dozen pharmaceutical plants now running. Plants for making agricultural chemicals, rubber products, Portland cement, detergents, and oxygen are on-stream. There are two oil refineries, one a 50,000-bpd unit, the other about half that. Both are eyeing petrochemicals.

A-building are an ethylene glycol plant, a silicon metal refinery, and a paper mill. These represent a "second phase" of development.

Once the industrial base was established, allied industries started building on it. This will be an ever increasing phenomenon.

For example, the ethylene glycol plant has a long-term contract with a refinery to buy ethane and propane gases which the refinery now burns. The silicon plant ties in with the fast-growing electronics industry (now numbering 63 plants) and with local raw materials.

The paper mill will transform plentiful bagasse (sugar cane minus the sugar) into paper and cardboard, most of which must now be imported. Now in the works are three new projects to produce hardboard and wallboard from bagasse.

The Puerto Rican government does its best to help prospective companies learn how the island will fit into their setup. Through its Economic Development Administration, government economists give freely of their time to make objective plant location, raw material, labor, and market surveys. (These are arranged through the E.D.A.'s Continental Operations Branch, 666 5th Avenue, New York 19, or through their offices in Chicago, Los Angeles, Miami, and San Juan.)

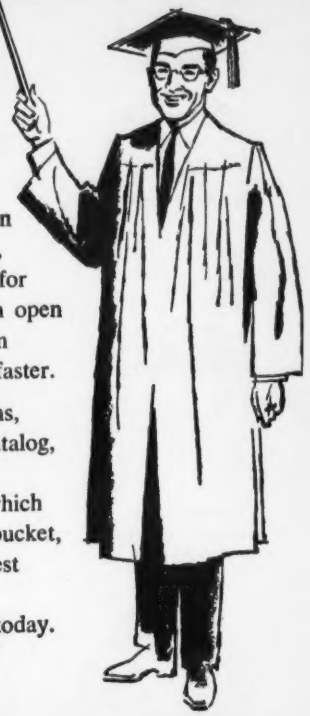
The government is interested in attracting promising operations. They discourage plants that have a strong chance of not doing well. As a result, the plant mortality rate in Puerto Rico is less, percentage-wise, than on the U.S. mainland. (The figures are 6.8% and 9.4% respectively.)

If an operation is known to be highly profitable, and the

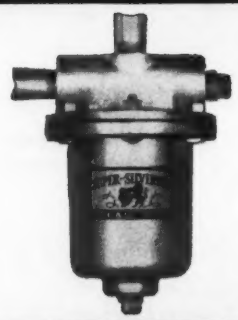
Which design of trap is best?

You can increase the heat from steam units as much as 35% by careful selection of the right design of trap. For example, although inverted bucket traps are best for most normal indoor uses, a combination open float and thermostatic trap permits steam units to reach maximum heat 2½ times faster.

For other sound design recommendations, send for Anderson's new engineering catalog, "How to Select SteamTraps and Fluid Specialties." This valuable booklet tells which of the four basic types of traps—inverted bucket, thermostatic, combination or float—is best for any installation. Send for your complimentary copy. Mail the coupon today.



ANDERSON SUPER-SILVERTOP STEAM TRAPS



THE V. D. ANDERSON COMPANY
division of International Basic Economy Corporation
1948 West 96th Street • Cleveland 2, Ohio

Please send a copy of your new engineering booklet, "How to Select Steam Traps and Fluid Specialties."

Name _____ *Title* _____

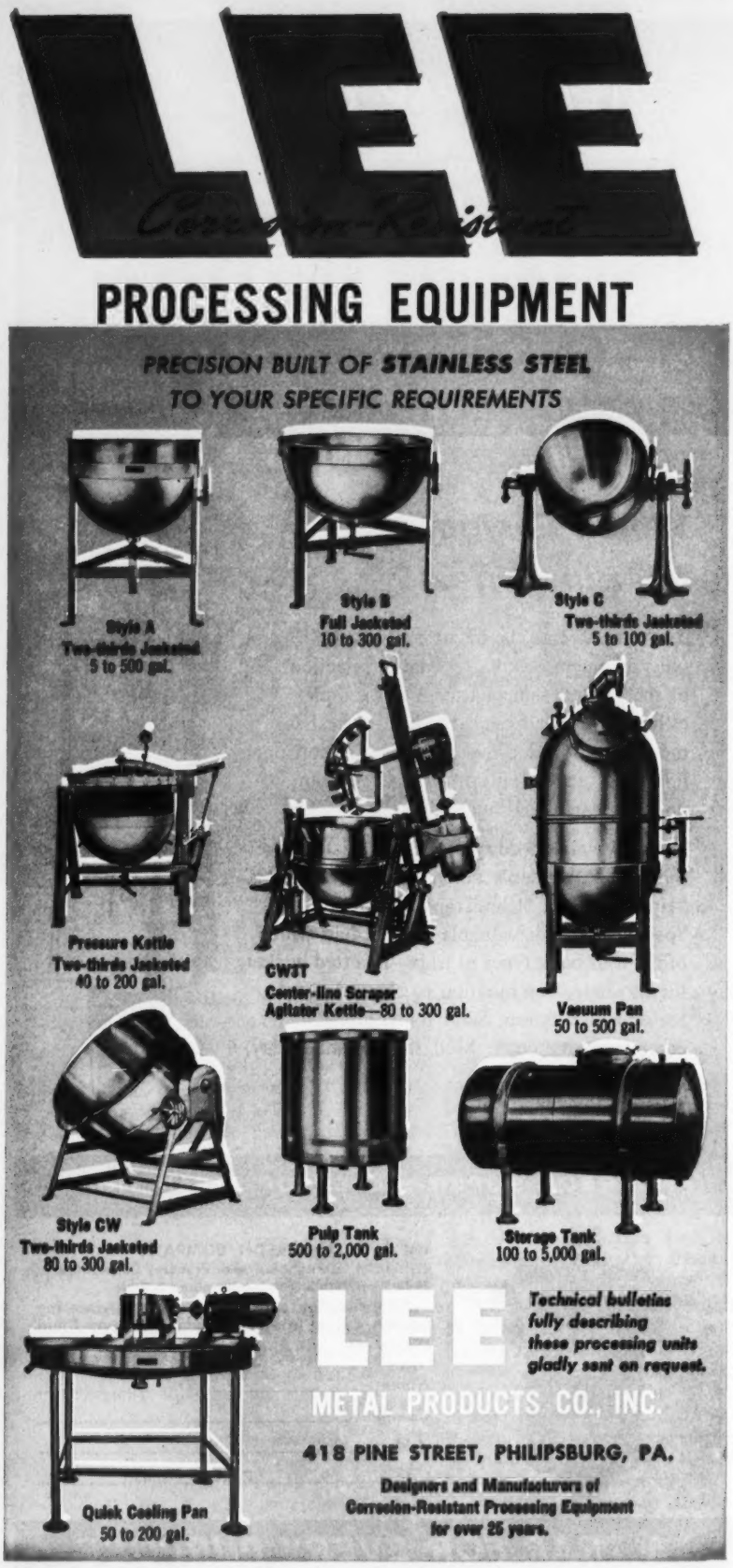
Company _____

Address _____

City _____ *Zone* ____ *State* _____

A TRAP FOR EVERY PURPOSE

Check 1032 opposite last page



Check 1033 opposite last page

'Inside' Puerto Rico

From preceding page

final product is fairly easy to ship at low cost, it is an excellent idea to locate the plant in Puerto Rico. Here's why.

Even though the economics might not favor the island in every step, the ten-year tax moratorium means that a profitable operation can even be *more* profitable. Even then, after ten years the Puerto Rican government takes only about 60% as much corporation tax as does Uncle Sam.

The operation of branch plants on the island can be another way to maximize profits. For example, a plant makes components for its parent company on the U.S. mainland. The actual value of these components is often difficult to determine. Therefore, if this value can be placed at the highest justifiable point, then the Puerto Rican operation will make as much (tax free) profit as possible.

Transportation

All transportation on the island is by truck, bus, or car. Many maps show a railroad circling the island, but this has been abandoned in most places other than the sugar cane areas.

The haul to and from the U.S. mainland presents probably the largest problem, both in money and time. Therefore, manufactured items should be easy-to-ship products. There is little red tape associated with making shipments.

If the island were ever opened to foreign shipping, it is estimated that shipping costs might be cut by a third.

To overcome this distance problem, one shipping company has started up a fishyback (trailer ferry) service between the island and Jacksonville, Florida. This, coupled with an ever-improving road around the island, should improve transportation efficiencies.

Barge shipment is becoming attractive to the chemical companies. The perimeter of the island is quite accessible. Gonzalez Chemicals uses two all-steel sea-going barges to carry sulfate of ammonia from their Guanica plant, on the southern coast, to distribution facilities on other parts of the island.

Maintenance Services

The basic maintenance services required by the chemical industry are available both near San Juan on the north coast and the Ponce-Guanica area on the southern coast.

These are adequate for 98% of all repairs needed. Thanks to good air service, the other 2% can be expedited quickly.

Plants in these two areas have an informal agreement. Lift trucks, valves, and other equipment are "traded" back and forth in an emergency.

It appears that the basic work has now been about completed in developing facilities and in training personnel. A chemical company that builds on the island between now and 1964 still gains the ten-year tax exemption that originally attracted the "pioneering" companies to the island, and yet doesn't sacrifice many of the conveniences of an industrial complex back home in the states.

Another attraction of Puerto Rico is the high productivity of its lower cost labor force. Many industrialists place this "resource" on a par with the tax exemption in making the island an attractive place to locate. They are quick to point out that if their companies did not first make a profit, there would be little value to having a tax exemption on profits.

Wages on the island, in some instances, are considerably lower than for the equivalent job in the states. Employees appreciate the opportunity of having a steady job. As a result, their productivity is only limited by their experience.

Morale is high. Even late in the evening after supper, refinery and construction-firm employees often wear their hard hats in local "Coke bars." These hats are considered as a mark of social prestige.

Obtaining experienced op-

erators and engineers for completely new industries to the island must be done at first. Since many islanders have never seen a chemical processing plant, much less worked in one, key jobs in new plants usually go to experienced personnel from the states.

Of the 550 employees at Commonwealth Oil, about 85 are from the states, president Roy Diwoky says. These are paid about 25% more than the equivalent job in the states. Biggest gripe — "Can't find low-cost housing."

Gonzalez Chemical Industries employs about 200 in their ammonia and sulfuric acid operations. Of these only six persons in top jobs are from the states.

Louis R. Gonzalez, president of the multi-million dollar Gonzalez Chemical Industries, believes that as time goes on, industry on the island will become less dependent on mainland personnel.

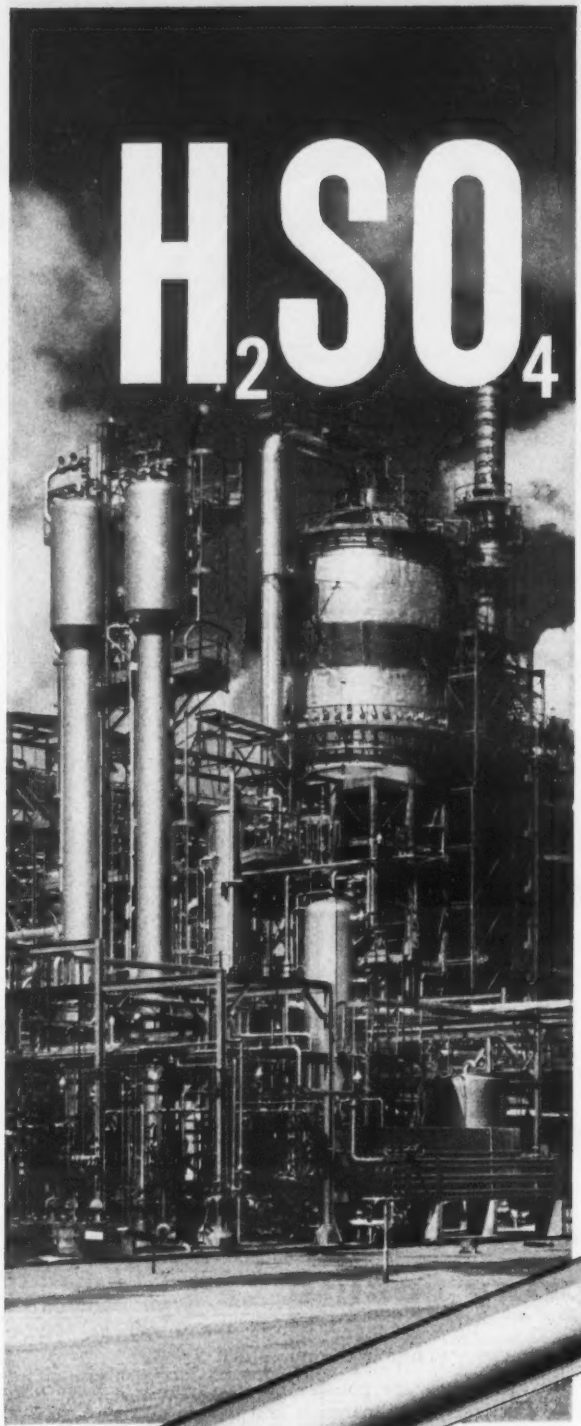
Even now, the "language barrier" is almost fully overcome. All high school graduates know English very well.

Not only is the University of Puerto Rico graduating hundreds of engineers each year, but many islanders are studying and working in the continental U.S. Many of them will welcome an opportunity to return as employment opportunities open up.

Gonzalez is himself an example of "local boy makes good." A native of Puerto Rico, he went to M.I.T., graduating in 1912. Now he heads the largest agricultural chemical complex on the island.

His favorite subject is to talk about Puerto Rico's future. "It is very bright, especially for the chemical processing industries. A favorable location and ideal weather, expanding local markets, lower cost labor having increasing experience, a broadening industrial base, and favorable political and tax climates are particularly attractive."

Gonzalez puts into words the thinking of most of those who are familiar with the business opportunities on this sunny self-governing Commonwealth.



in any concentration...
at any temperature to 500°F
can't corrode Fluoroflex®-T piping

liner of Teflon® in thermal equilibrium with housing

Sulfuric, hydrochloric, nitric, hydrofluoric—*any* acid is harmless to Fluoroflex-T piping.

Universally inert liner. Steel pipe and fittings are lined with Fluoroflex-T... a patented, high density, *non-porous* compound of Teflon.

Liner and housing are in thermal equilibrium through an exclusive process developed by Resistoflex. It compensates for thermal expansion differential between the Teflon and the pipe housing, eliminating fatigue collapse, and cracking at the flange.

Solves problems, saves downtime, saves money. Type S piping installed in steam cooking process for recovering sulfuric acid from coal tar sludge at 250°F and 50 psi has been in service over a year with no maintenance difficulties.

See how Fluoroflex-T Type S piping systems can end problems of corrosion, erosion and contamination for you. Send for detailed Bulletin TS-1A. Dept. 115, RESISTOFLEX CORPORATION, Roseland, New Jersey. Other Plants: Burbank, Calif., Dallas, Tex.

® Fluoroflex is a Resistoflex trademark, reg., U. S. pat. off.
® Teflon is DuPont's trademark for TFE fluorocarbon resins

RESISTOFLEX

Complete systems for corrosive service

LINED STEEL PIPE • FLANGED FLEXIBLE HOSE • BELLOWS • ELBOWS • TEES • REDUCERS • DIP PIPES & SPARGERS • LAMINATED PIPE

Check 1034 opposite last page

For "clear" look at specification card, write to Dow.

"Pure" and "Clear" describe new Dow solid epoxy resins

The visibility test shown above vividly illustrates the clarity, purity and uniformity of Dow Epoxy Resin 667, one of three new solid epoxy resins developed by Dow.

The unique advantages of D. E. R.* 661, 664 and 667 are: (1) Nearly water-white color. (2) No need for filtering after cutting because these resins are free from salt and any small insoluble gel particles often found in standard solid epoxy resins. (3) Sodium content that is under 10 P.P.M. (4) And D. E. R. 661 is easier to handle and dissolve in solvents; it has a higher melting point so when flaked has less tendency to fuse in warm weather.

These properties are possible because Dow is a basic producer of epoxy raw materials and is able to assure quality control and a narrower range of specifications. For more technical data on Dow Solid and Liquid Epoxy Resins contact your local Dow sales office or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Department 2255Q-1.

*TRADEMARK OF THE DOW CHEMICAL COMPANY

EPOXY

YOU CAN DEPEND ON DOW

Check 1035 opposite last page

CHEMICAL BUSINESS

Linear polyethylene in for trouble?

Report says polypropylene may capture markets

"The implications are that industry may find it more advantageous to shift capital resources from planned linear polyethylene expansion into polypropylene capacity if possible," according to a recently published report on the polyethylene and polypropylene industries. "The overcapacity situation which will prevail for the next five years will not be alleviated by export dumping as has been true for conventional polyethylene. Foreign producers are not far behind the U.S. in making the newer polyethylene which is stronger, tougher, and more heat resistant."

But pointing up an even bigger problem for U.S. producers, the report continues, "Polypropylene may well be a bigger selling plastic than polyethylene. It will be a short time before this is determined definitely, but initial indications are that polypropylene has distinct property advantages over polyethylene and may be even cheaper to produce."

The report, compiled over a period of six months by a group of Harvard Business School graduates, attempts to bring together the vast quantity of sometimes contradictory information on the materials and their potential markets. It covers such areas as the present position, current problems, and future plans of resin manufacturers in the U.S. and abroad; case histories of fabricators' experience with the materials, and an objective analysis of their problems and opportunities; an appraisal of the trends and uses of these materials, and their impact on conventional plastics and other materials.

Copies of "Linear Polyethylene and Polypropylene, Problems and Opportunities" are available at $13.50 from Polymer Associates, 6613 Wenonga Road, Kansas City, Mo., or check 1036 opposite last page.

Public Still Bearish Toward Chemical Stocks

WILLIAM R. WHITE
Market Analyst
Hornblower & Weeks

In this year's stock market readjustment, chemical stocks have lost considerable luster. While many consumer goods groups have recovered vigorously, chemicals have consistently lagged.

The investment public's cautious attitude toward a group which outperformed most other major segments of the list over the years may be ascribed to three principal reasons: 1) an evident conviction that long-term growth potentials of representative issues had been overdiscounted in the upsurge culminating in 1956-1957; 2) apprehension over shrinking profit margins which result from intensified competition caused by excessive capacity; and 3) prospect of a continued slow demand for chemicals in heavy industry.

The pronounced decline in steel operations this year, for example, has contributed to an unsatisfactory earnings showing for Union Carbide, one of the largest suppliers of raw materials to the steel industry. Shares of this company had retreated from their record high of 133⅜ in 1956 to about 84 several months ago, a retracement of almost 40 percent.

The subsequent recovery (retarded by uncertainty over uninterrupted dividends at 90 cents quarterly while not fully covered by earnings) proved relatively modest. A large part of the decline in sales experienced in the first six months was attributable to reduced requirements of steel industry customers.

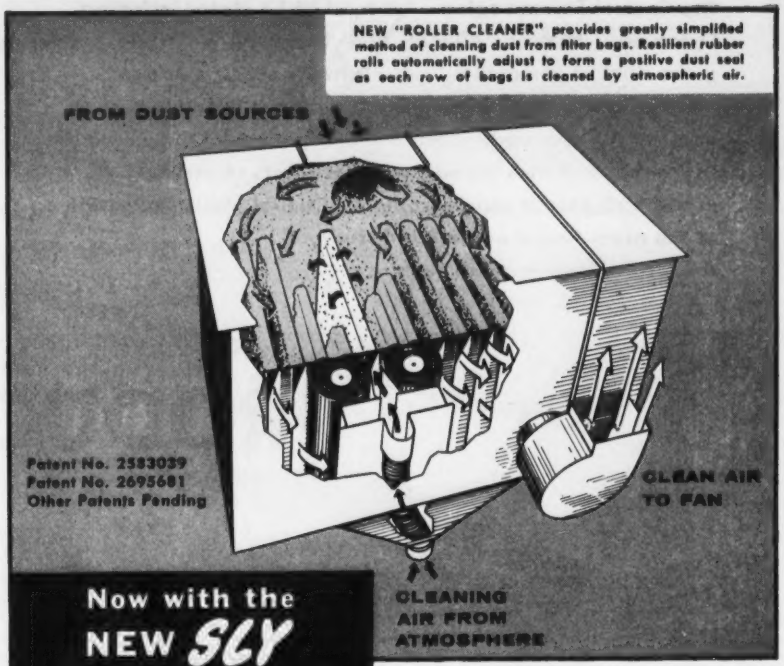
On basis of projections taking into account a letdown in activity in the current quarter, it is thought that Union Carbide may reach about $1300 million in sales this year, compared with $1395 million in 1957. On this assumption it is calculated that net profit could approximate $3.75 to $3.80 a share, against $4.45 for 1957. Such a showing would afford modest protection for the $3.60 annual dividend.

A substantial decline in earnings this year is envisioned also for Allied Chemical, another major producer which depends to a great extent on heavy industry. Net profit for the first nine months of 1958 is expected to approximate $2.25 a share, equal to the indicated dividend rate for the three quarters. Full year's earnings may amount to about $3.25 a share, compared with $4.37 a share in 1957.

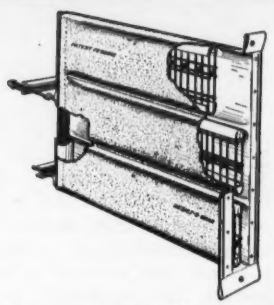
In view of a general hopeful outlook for a recovery in industrial activity by the December quarter, one may readily understand reluctance on the part of directors to reduce payments to stockholders below the $3 annual rate of the last eight years.

The favorable market action of Eastman Kodak Company this year undoubtedly can be traced in part to encouraging progress of the Tennessee Eastman textile division. As one of the major producers of acetate filter materials for cigarette manufacturers, Eastman has experienced an encouraging gain in volume comparable with the spectacular progress achieved in consumption of filter brands. Prospects for Eastman Kodak were discussed here in the January issue.

(For further information on chemical stocks write Hornblower & Weeks, 40 Wall Street, New York 5, N.Y. or check 1037 opposite last page.)


NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.
FROM DUST SOURCES
Patent No. 2583039
Patent No. 2695681
Other Patents Pending
CLEAN AIR TO FAN
CLEANING AIR FROM ATMOSPHERE

Now with the NEW SLY "ROLL-CLEAN" DYNACLONE



As much as 3 TIMES LONGER BAG LIFE

NEW SLY "RESIST-O-WEAR" FILTER BAGS (patent pending) provide complete dust filtration with as much as three times longer life than conventional bags. This has been proved on the toughest field installations.

The new bag has three equal-size sections. Each pocket has two spacers, making a total of six per bag. Weight is distributed on three seams rather than one, minimizing strain. A special protective flap on the back end prevents abrasion from incoming dust.

Now standard in the new "Roll-Clean" Dynaclone, Sly "Resist-O-Wear" bags combine with all the other superior Dynaclone features to assure greatest dust collecting efficiency with unequalled maintenance-free service.

ALL THESE FEATURES IN ONE DUST FILTER

- New "Resist-O-Wear" bags last as much as three times longer.
- Free-rolling cleaner. Complete dust seal—automatic seal adjustment.
- Constant suction at dust sources—complete dust collection.
- Greater filtering capacity; smaller space requirements.
- Automatically self-cleaning for continuous operation.
- Simplified construction for ease of inspection and servicing.

SEND FOR New Bulletin 105 and New 36-page Dust Control Catalog 104.

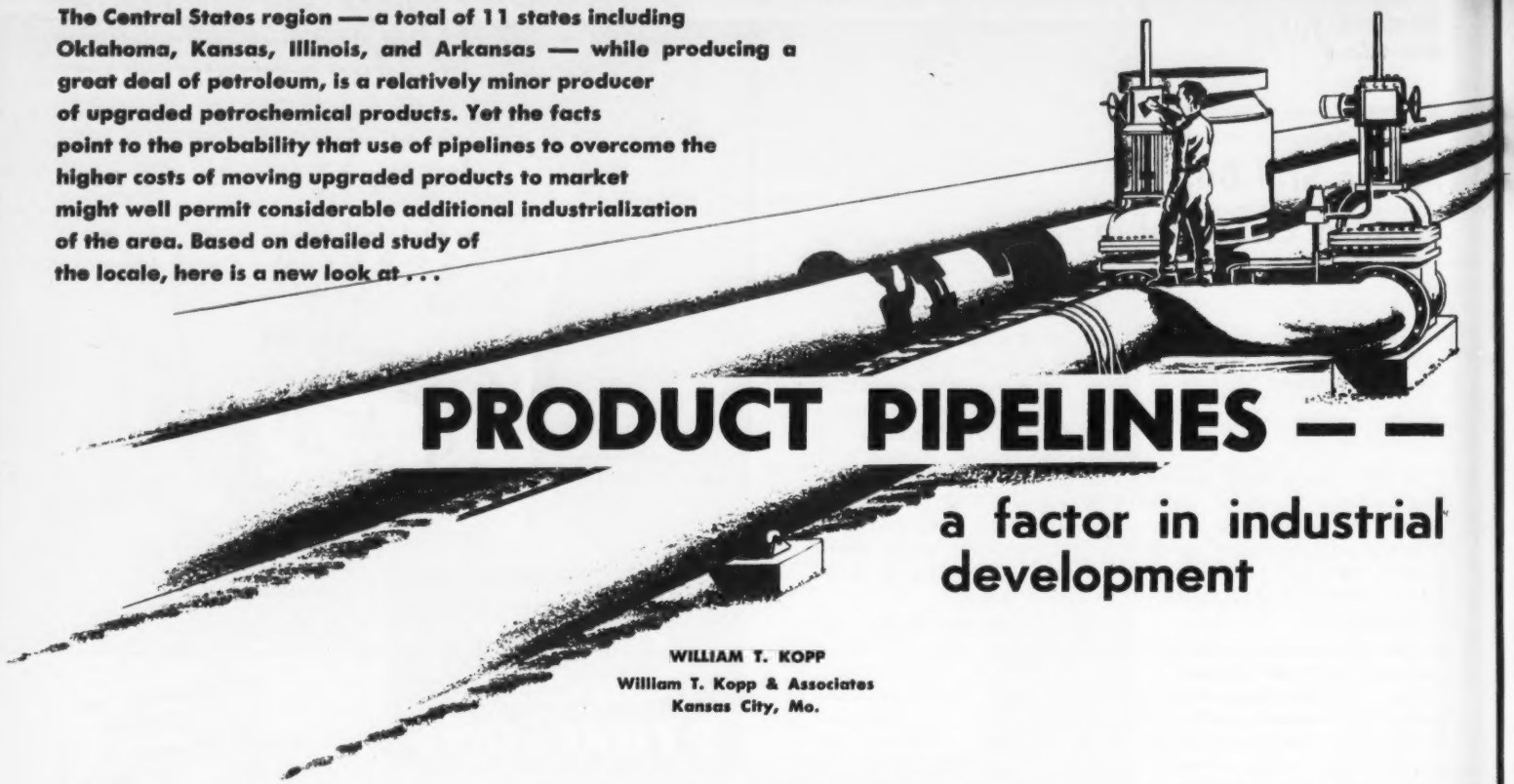
SINCE 1870 SLY

THE W. W. SLY MANUFACTURING CO.

4754 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

Check 1038 opposite last page

The Central States region — a total of 11 states including Oklahoma, Kansas, Illinois, and Arkansas — while producing a great deal of petroleum, is a relatively minor producer of upgraded petrochemical products. Yet the facts point to the probability that use of pipelines to overcome the higher costs of moving upgraded products to market might well permit considerable additional industrialization of the area. Based on detailed study of the locale, here is a new look at . . .



PRODUCT PIPELINES — — a factor in industrial development

WILLIAM T. KOPP
William T. Kopp & Associates
Kansas City, Mo.

Pipelines for years have economically gathered and brought petroleum raw materials over considerable distances to a central production point. But they can also serve as a low-cost carrier for upgraded products and intermediates from this point to distant markets. And for regions now dependent upon higher-cost carriers to transport these upgraded chemical products to market, existing and proposed product pipelines offer perhaps the sole means of overcoming a transit cost disadvantage.

This concept can best be illustrated by pointing to the Central States region,* which is currently a volume producer and shipper of crudes and raw material to Chicago and other producing centers to the east. Yet the high costs of transporting upgraded products to market have for the most part discouraged manufacturing of these materials in the area. Actual industry growth can now be found within the area only in those few locations which are in a position to take advantage of barge, pipeline, and high-volume rail rates.

*North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Arkansas, Missouri, Iowa, Minnesota, Wisconsin, and Illinois.

Already many products simflar to petrochemical intermediates are being shipped via pipelines throughout the country; for example, gasoline, LPG, and kerosene. And lines are now carrying petrochemical intermediates for short distances in various areas, seldom exceeding 50 or 100 miles.

One Problem

So far the economics of pipeline shipment of petrochemicals have been viewed from the single-company or perhaps single-state viewpoint, where sufficient quantities for economical transmission didn't exist. However, by considering all sources and perhaps groups of states, we find that economical quantity shipments do exist and transmission is considered practical by a number of pipeline companies.

For example, we can estimate that two GR-S rubber plants in Akron, Ohio, will use something on the order of 90,000 annual barrels of benzene — and this is only one city and one industry. Rough estimates of benzene markets in the portion of the Midwest where the Central States might compete successfully with the Gulf Coast producers are conservatively placed at between 500,000 and 700,000 barrels per year.

A chemical company in Kansas ships a minimum of 150,000 barrels of methanol to Chicago each year via tankcar for processing into formaldehyde. Lube oils are a high-volume product involving anywhere between five and seven million barrels annually. Naphthalene would seem to be an excellent material for pipeline transmission. Ethylene dissolved in crude and separated at the destination could be a possibility. Thus, when you consider that transmission of these and other products can reach satisfactory volumes, it becomes apparent that pipelines are practical as carriers of these products to markets.

Costs

There are three major problems to consider in relating the use of product pipelines to industrial development:

- The technical feasibility of transmitting specific petrochemicals via product line
- Obtaining sufficient markets for intermediates and upgraded products to insure economical volume shipments
- Achieving a total cost structure, through the use of pipelines, which is lower than that afforded by the present process flow pattern of raw materials to markets.

Again let's look at the Central States region which is unable to compete on an equal transportation basis with the more populated areas of the United States. The problem is a rail rate structure which, for the most part, reflects relatively low volumes and a lack of competition with carriers of other types. Therefore, it has been more advantageous to ship bulk materials, taking advantage of the lower bulk rates, and to let these materials be upgraded and finished elsewhere.

It would seem now that the present process flow, determined largely by disadvantageous rail rates, may be economically incorrect, and that by the use of product lines for transporting higher-tier chemicals — and by the use of new carriers, perhaps barge transportation — some upgrading industries can more economically operate near the source of supply. Such factors as lower fuel costs, the reduction of bottom materials from transit volumes, more open construction because of the warmer climate, and other cost savings may make it more advantageous to establish

some of these processing industries in the Central States area.

Eleven-state Transportation Rate Pattern

The fact that the 11-state area under study is for the most part a sparsely populated and sparsely industrialized region is reflected in its transportation rate structure, especially the rail rate structure. The part of the area located west of the Mississippi River suffers more heavily from the rate disadvantage than the part east of the Mississippi. Constant use of the well-developed competing types of transportation available on the eastern side of the Mississippi has helped to force down the

WILLIAM T. KOPP was graduated from the University of Kansas with degrees in business administration, economics, and architecture. He later taught marketing and economics at the school. In 1947 he joined Montgomery Ward & Co. as industrial engineer and supervisor of departmental operation.

Kopp joined the Ford Motor Company as industrial engineer in 1951, with responsibilities for tooling program costs and procedures, and policies of plant operation. In 1953, he became associated with Midwest Research Institute as associate economist, where he organized and staffed the industrial planning section. In 1957 he established William T. Kopp & Associates, his own consulting service specializing in industrial marketing, industrial development, transportation economics, and related fields.

WANTED
PHIL FLANGE
(ALIAS ECONOMY OF PERFECTION)
DESCRIPTION:
1. SELF-CENTERED. Another OTM FIRST. Every Flange is centered for faster, surer installation. Saves time, expense.
2. Wears OTM Blue Ribbon Guarantee (Only flange in the world with such a guarantee.)
3. Welding neck, threaded, slip-on, ASA lap-joint and blind, may be ½" through 24"—150 through 2900 lbs.
4. Close tolerance—1/32" concentricity—the closest in the industry—makes welding easier.
WARNING:
Phil "The Blue Ribbon Flange" has a concentric serrated face. He works 24 hours a day—never tires under pressure. BE ON THE LOOK OUT FOR HIM—NEVER GOES UNDER ANY NAME EXCEPT OTM BLUE RIBBON!
IF YOU SEE HIM—YOU'RE LUCKY—IF YOU DON'T—LOOK FOR HIM!
WANTED BY PIPEFITTERS AND PLUMBERS ALL OVER THE WORLD
REWARD: OTM Blue Ribbon Guarantee—the most comprehensive written guarantee in the industry!
CONTACT
OTM CORPORATION
P. O. Box 19296 Houston 24, Texas UN 2-6643
Odessa - Dallas - New York - Baton Rouge - Los Angeles - Tulsa

Check 1039 opposite last page

Over 3000 Companies buy CHARTS from Technical! DO YOU?

Saves your time... Holds down costs

Obvious economies result from "single source" purchasing of *all* recording charts. Why write a dozen purchase orders to different suppliers when *one* to Technical does the job? Fewer headaches, too, in "following through."

ACCEPTANCE by America's leading industrial firms attests to Technical's fine quality — achieved through years of specialization in one product.

Serving America's "Blue Chip" Industries

TECHNICAL SALES CORPORATION

16599 Meyers Road Detroit 35, Michigan

National Representatives for

STAEBLER & BAKER, INC. Clayton, N. Y. — TECHNICAL CHARTS, INC. Buffalo, N. Y.

ISA Show, Philadelphia, Booth 1044 & 1046

Check 1040 opposite last page

Product Pipelines

From preceding page

high cost of rail transportation.

In most of the areas west of the Mississippi, transportation competition with the railroads is practically nil for most manufactured products. Rail volumes are generally relatively low in comparison with more heavily traveled areas of the country.

Rail competition in this western half consists primarily of Mississippi barge traffic; competition from Missouri barge traffic has so far had very little effect. For raw-material producing areas such as the oil fields in Oklahoma and Kansas, special rail rates are given to petroleum products, but pipelines still undercut the rail rate by approximately one-third for refined oil products and approximately one-fifth for crude oil.

For example, crude oil from Colorado and Nebraska to Chicago carries a rate of $0.35 per barrel via pipeline and a rate of $1.21 via railroad tankcar. Comparing some Canadian movements of crude oil from southwest Saskatchewan to St. Paul, the pipeline rate is $0.77 per barrel as against a railroad tankcar rate of $6.18 per barrel. From the Arkansas-Louisiana-Texas area centering around Shreveport to Cincinnati, pipeline rates amount to $0.40 per barrel as compared with $2.04 for railroad car rates.

Product pipelines can be advantageously used for even relatively short distances in pipeline gathering systems, usually about 100 to 150 miles or less. It costs $0.15 to $0.50 per barrel to bring in the required volume by truck as compared with $0.05 to $0.10 per barrel by using gathering pipeline systems.

Trends further show that the relative differences of crude to product line tariffs are narrowing. This is being brought about by better and more practiced knowledge on costs and methods by product line systems, and by technological advances in transmission and the reduction of product mixing.

Laid-in costs for present process-flow patterns can be compared with the proposed new pattern to ascertain whether or not there is any cost advantage in added processing in the 11-state region. Based on our analysis, there appears to be a good possibility that some of these raw-material process reviews will indicate industrialization advantages for specific areas of the region — namely, the immediate Kansas City area, Tulsa, Wichita, and possibly other central southwest areas.

If product pipelines are used, the products from Kansas, Oklahoma, and northern Texas could compete on an equal or better transportation cost basis with products from the Gulf Coast in approximately one-third the chemical-consuming market. This market would include such cities as Minneapolis, St. Louis, Chicago, Detroit, and perhaps Akron, Buffalo, Midland (Michigan), and other centers of chemical production.

However, by using a combination of pipeline transmission to Kansas City, where the petrochemical intermediates are upgraded to chemical form, and then shipping via barge, the market area would be increased to include especially the Ohio River ports all the way to Pittsburgh, with the possibility of even going further to the Great Lakes, on to Buffalo, and perhaps to New York City itself. Active competition can be had with the Gulf Coast, and by utilization of product pipelines and/or barge shipments, there is a definite area of sizable market intensity which would await growth of a petrochemical industry in the Central States region.

NEXT MONTH

How Chemstrand Corporation solved an almost insurmountable waste disposal problem when they enlarged their nylon plant is revealed in the October New Solution section's feature article.

CB Profile: Wyandotte

From page 29

with ethylene to form chlorohydrin; and then lime and chlorohydrin produce the ethylene oxide.)

The Geismar plant is a different breed of cat. Reversing the previous position on process, the new operation is the first to use oxygen for the direct oxidation of ethylene in the process for ethylene oxide, a Shell development, although the chlorine raw material situation will exist at Geismar just as it does at the Michigan plant. And with the plant on stream, Wyandotte finds itself a full-fledged performer in what is probably the greatest industrial show on earth — the petrochemical business.

Looking at the operation from this standpoint, it's easy to see why the company's management holds so much enthusiasm for Geismar.

Why the Face-lifting?

A few years ago, the company wouldn't have considered such a bold move as the Geismar plant. What's been behind this new "personality," and what started the face-lifting in the first place? Probably the best answer lies in a look at the company as it existed a few years back.

Even as late as the early '50s, Wyandotte was something less than a dynamic organization. Although in a good basic business, it had a number of soft spots and was a low earner with a net about half the average for its segment of the chemical industry.

The physical plants and equipment were badly in need of repair or replacement (it has spent $25 million in the past five years on refurbishing its manufacturing facilities alone), and the organization was relatively static. And although the company had an excellent reputation, it wasn't viewed as a force of any consequence in the industry.

Sales over the past ten years or so have grown at a rate close to that of the US

Another new development using

B.F.Goodrich Chemical *raw materials*

"Zippertubing" is produced in standard lengths from 25 to 1000 feet, in varying sizes and colors, by The Zippertubing Company, Los Angeles. Shielding material used in it is manufactured by Cordo Chemical Corporation. B.F. Goodrich Chemical Company supplies the Geon polyvinyl material.

New shielding and jacket made with Geon can be zipped on in a single operation

Production and maintenance of wire harnesses are greatly simplified with this new shielding and jacket combination made with Geon polyvinyl material. All you do is zip it on. Saves time and equipment during manufacture—makes it easy to replace the jacket if it has to be removed to get at wiring for service.

For regular RF shielding, glass cloth saturated with Geon polyvinyl material is laminated to aluminum foil. It gives 100% coverage to provide immediate grounding of RF and UHF interference. The outer surface, also of Geon, has zipper tracks sealed in. A pull tab can easily be used to facilitate closure.

For heavier magnetic shielding, special steel foil is laminated between layers of Geon. Lead saturated glass cloth is available for radiation problems.

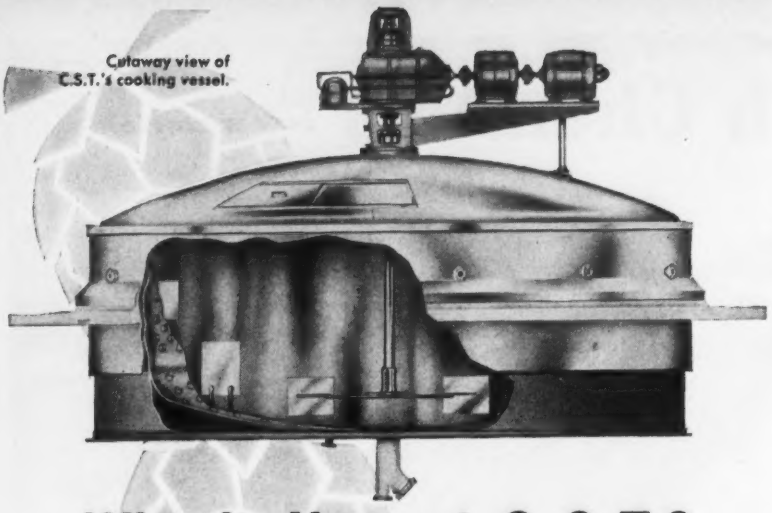
Geon provides high insulation resistance, heat stability and extra strength, as well as accuracy in molding. It's another example of versatile Geon proving the key to a dramatic new product. For information, write B.F. Goodrich Chemical Company, Dept. LJ-9, 3135 Euclid Avenue, Cleveland 15, Ohio.

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

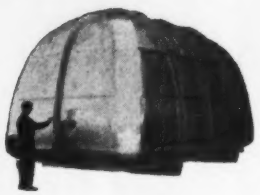
GEON polyvinyl materials • HYCAR American rubber and latex
GOOD-RITE chemicals and plasticizers • Harmon colors

Check 1041 opposite last page



Cutaway view of C.S.T.'s cooking vessel.

What's New at C. S. T.?



C.S.T.'s new space saving "Dual Paraboloid" fermenting tank.

The vessels illustrated here are new for the brewing industry. They have helped increase production from a few barrels a day to many times that, yet the "Old World" brewmasters quality has been retained.

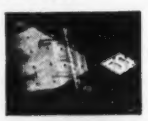
The same ingenuity and know-how that developed and fabricated these designs for this industry can be applied to your problem . . . whatever it may be.

In the petroleum and petro-chemical fields, C.S.T. has been turning out tanks and vessels—of all types, in all sizes and shapes—since 1899.

When you need equipment for your particular process, investigate the savings in time and money C.S.T. engineers can bring about for you. We're equipped to handle your complete requirements.

Our Most Important Products—QUALITY and SERVICE.

Write for your personal copy of the brochure describing C.S.T.'s facilities.



Custom fabricators and erectors since 1899

CHICAGO STEEL TANK COMPANY

division of U.S. INDUSTRIES, INC.

SALES OFFICES: 6400 W. 66TH STREET • CHICAGO 38, ILLINOIS • PO-7-8900
51 E. 42ND STREET • NEW YORK, N. Y. • MU-7-9298

Check 1042 opposite last page

CB Profile — Wyandotte Chemicals

From preceding page

economy, and the company's assets have also had a rather respectable increase. But although earnings in some years have been quite satisfactory, they have had a wide range, varying from eight cents per share in the year of a major strike to $2.98 within the past six years. But this swing represents a doubling since the strike and completion of the broad program of improvement.

Wyandotte Chemicals had its beginnings back in 1890. Captain John Baptiste Ford (also a founder of Pittsburgh Plate Glass) founded Michigan Alkali Company to furnish soda ash to the glass industry. Eight years later the J. B. Ford company was formed to convert Michigan's raw material into specialized cleaning compounds.

Although it became a leader in the basic alkalis, nothing really of consequence to the company happened until 1943 when the two entities were merged into Wyandotte Chemicals Corporation.

The New Chart

Wyandotte's reorganization actually began in the early '50s. The previous organizational chart, built largely along functional, departmental lines worked fine for a smaller company, but as Wyandotte grew, problems began to appear. Communications, never anything to write home about, began to be more of a problem, and coordination needed improvement. It was apparent to Semple soon after he joined the company as president that a divisional organization was needed to allow for future growth.

In 1952 the divisional structure was started with divisionalization of the J. B. Ford operations and sales. It was completed in 1955, the end result being to make each group — Michigan Alkali division, headed by Bert Cremers, the J. B. Ford division, headed by Ford Ballantyne Jr., and the General Products division, headed by George W. Schwarz — autonomous to a great extent.

The exception to this plan was research. While the company previously had 13 separate research operations, scattered all over the Wyandotte plants, the new plan brought them into a central location and supervision. The net result has been to allow research to broaden into more basic and advanced work, where the old set-up had tended to limit itself largely to technical service and such.

New Faces

Concurrently with the building of the new organizational structure, new people began to move into the company. Bob Semple, who had been director of general development for Monsanto, took over the presidency in 1949 and began a search for men with needed talent and experience to supplement Wyandotte's seasoned management. The result of the quest has been a very favorable age average and a young enthusiasm to match his own zeal for the business.

New Stockholders

Another significant move occurred in 1956 when 100,000 newly issued shares, or about seven percent of the now outstanding common stock, privately held until then, was put up for public sale. (The bulk of the stock is still held by the Ford family and they show no great eagerness to sell more of it.)

George H. Baker, Employee and Public Relations VP, feels that this was an extremely important step for the company. "It has led to a much better relationship between the management and employee groups," he explains, "and has helped ease some of the misunderstandings that always seem to crop up in a privately held company. It has probably also improved relations with some of our customers."

Wyandotte has come a long way since the early days of

the reorganization. The company's sales have kept up a nice growth curve, paralleling the growth of the new management. Showing a respectable increase every year since 1952, sales in 1956 were a little over $79 million, and 1957 sales reached $85 million with net earnings of almost $7 million, including a nonrecurring $2,067,000 profit from the sale of its Alpena limestone quarry.

"I rather hesitate to talk about the sales growth," confides Semple, "after the general business decline we had in 1958. But we, like a lot of the chemical industry, didn't expect '58 to be as big a year as 1957 had been and, in any case, it certainly doesn't detract from what the company has already done in the way of progress."

Chemicals and Basic Industry

What Semple refers to is the problem common to many chemical makers who are tied very closely — perhaps too closely — to big basic industry. When steel slowed down in the last quarter of 1957, Allied Chemical, for example, felt it very acutely, and it has happened to many others in the industry.

Probably Wyandotte's major trouble was the sharp decline in the glass business, torpedoing its soda ash volume, as well as a pronounced drop in paper production. J. B. Ford division's cleaning and sanitizing product markets have held up much better, reflecting the pattern of the general economy.

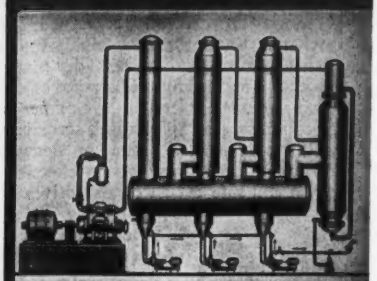
And starting costs of the Geismar plant also have had considerable effect on profits.

New Directions

But there's little doubt about Wyandotte's future. The flexibility it has shown recently, and the enthusiasm displayed by its management, all attest to its increasing strength. The question now isn't whether it will grow but how quickly and in what directions it will be growing.

And Geismar, perhaps, is

Mojonnier
LO-TEMP
EVAPORATORS



for
▶ concentrating heat sensitive chemical solutions
▶ recovering solvents

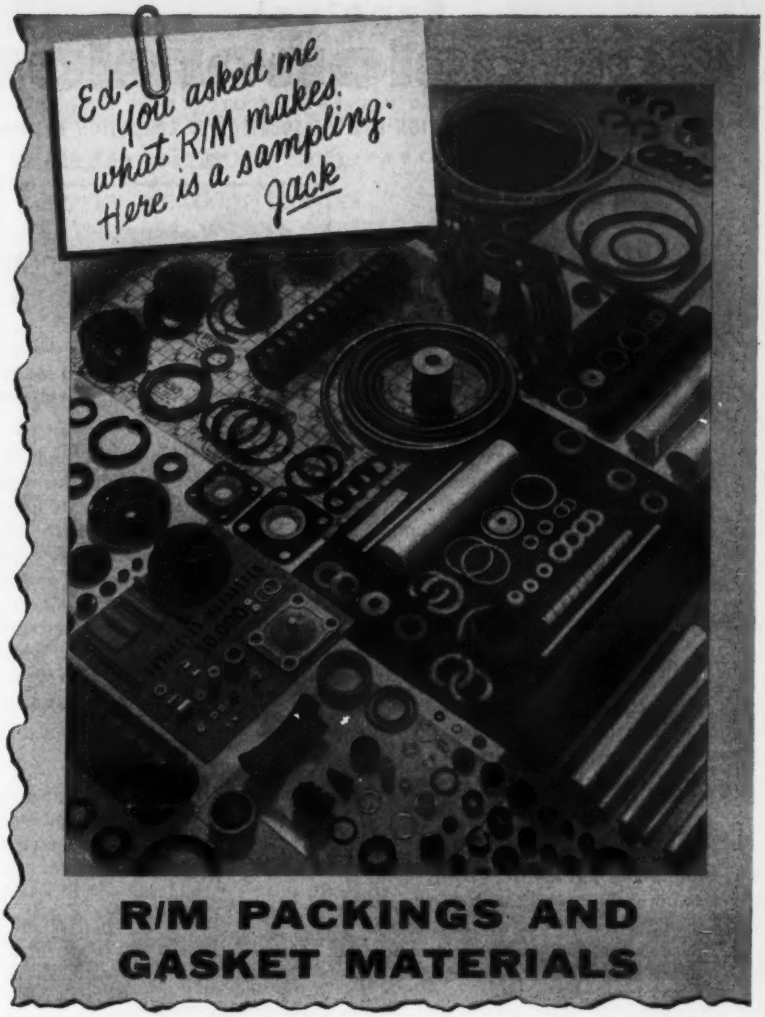
▶ No steam required.
▶ Uses negligible amount of condensing water.
▶ Low operating temperatures.
▶ Less operating attention.
adds up to
lowest concentrating cost!

Pictured Above —
MOJONNIER TRIPLE-EFFECT LO-TEMP EVAPORATOR as installed in large chemical plant, evaporating 5,000 lbs. of water per hour from a chemical solution at a maximum temperature of approximately 40° C. The unit uses a 75 h.p. ammonia compressor.

Full details on the Lo-Temp Process will be sent you promptly.
Write: MOJONNIER BROS. CO.
4601 W. OHIO ST., CHICAGO 44, ILL.

QUALITY Mojonnier YOU CAN TRUST
LO-TEMP EVAPORATORS
Sales Offices in Principal Cities

Check 1043 opposite last page



R/M PACKINGS AND GASKET MATERIALS

When you specify R/M, you specify quality—in mechanical packings, gasket materials, molded and extruded parts, and engineered plastics. In manufacturing these products to meet the most exacting requirements of all industries, R/M engineers have amassed a wealth of experience. It is all at your disposal when you face unusual problems—and you will find it an essential ingredient of the entire line of R/M products.

Among the hundreds of specialized R/M products are:
- Compressed Asbestos Sheet
- Rubber Sheet
- Cloth Inserted Rubber Sheet
- Neoprene, Buna-N, Silicone Rubber, "Teflon"* Sheet
- Silicone and "Teflon" Extrusions and Moldings
- The Famed Big 7 Line of Packings (solve 95% of your packing needs)
- Teflon Tubes, Rods, Tape, Expansion Joints, Couplings Gaskets and Filaments
- Molded Hydraulic and Pneumatic Parts, including Vee-Square,® Vee-Flex,® Piston Cups and Rings.
- High Temperature Valve Stem Packings
- "Teflon" Impregnated Asbestos Cloth

*A Du Pont trademark

See your R/M distributor or write today for further information

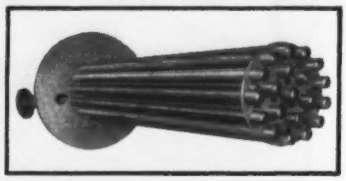
R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings Brake Blocks • Clutch Facings • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 1044 opposite last page

Fansteel
Corrosionomics
REGISTERED U. S. PATENT OFFICE
A JOURNAL OF USEFUL INFORMATION FOR THE SOLUTION OF CORROSION PROBLEMS

TANTALUM BAYONET HEATERS CUT ACID PROCESSING COSTS



Fansteel tantalum bayonet heaters come in a wide variety of sizes and shapes to fit the most critical need.

Tantalum bayonet heaters are the most economical heating units obtainable for extremely corrosive acid solutions (except hydrofluoric and fuming sulfuric). This can be proved on a cost reduction basis if all the factors of highly corrosive service are carefully considered.

Acid Proof—Long Life

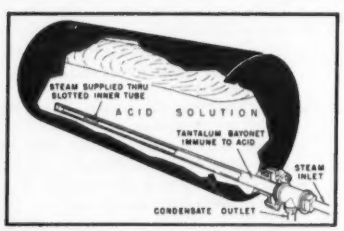
Fansteel tantalum bayonet heaters are ideally suited to acid processing requirements for several reasons. First, the pure metal is not subject to thermal shock. It is acidproof, not just acid-resistant—which makes product contamination impossible. Fansteel tantalum also has high tensile strength, compressibility, impact strength and ductility. Since no corrosion allowance need be made, only the thickness required for structural strength need be used.

High Processing Rates

Acid processing rates are very high with Fansteel tantalum heaters. The special design permits rapid removal of condensate on the steam side, promotes high velocities of both steam and condensate, and keeps the condensate film at minimum thickness. The heaters are never flooded and air can be discharged readily with the condensate. Added to this is tantalum's high rate of heat transfer which further speeds processing. Overall coefficients of 500 to 1200 are commonly obtained.

Overall Economy

These characteristics combine to make tantalum the ideal material for use in critical pieces of equipment such as heaters. The initial cost is more than justified by long, trouble-free service, simplicity of design made possible in associated equipment, and even upgrading equipment with heaters made from other materials. Heating capacities and standard sizes of Fansteel single-tube, bayonet heaters are shown in our Bulletin 3.506. They are also listed in the Chemical Engineering Catalog, page 750.



For vessels with side or bottom openings, the bayonet heater is an effective unit (single or multiple tube). Steam enters through the inner steel pipe, escapes through slots near the end and heats the tantalum tube.

Free Tantalum Test Kit

A corrosion test kit, available without charge to research technicians, if requested on your letterhead; contains both tantalum sheet and wire.

Free Technical Information

The above condensation is typical of the articles which appear in CORROSIONOMICS, a Fansteel publication. Mail us your name for inclusion on our free mailing list.

G581A

SEE US AT THE National Chemical Exposition International Amphitheatre Chicago Booth 112

For further data on the above, write:

FANSTEEL METALLURGICAL CORPORATION
CHEMICAL EQUIPMENT DIVISION
NORTH CHICAGO, ILLINOIS, U. S. A.

Check 1045 opposite last page

CB Profile: Wyandotte

From preceding page

the best indication of these directions. The new plant site just outside the self-termed "Petrochemical Center of the South," Baton Rouge, La., holds a strategic position in what is almost sure to become one of the most important chemical areas in the US soon.

The company is committed to its new directions and will never again be thought of as regional. Instead, Wyandotte, ready or not, finds itself a growing contender in the big leagues of the chemical business.

Research Taxation

From page 28

Should non-profit institutions, seeking to maintain the essential and appropriate duality of basic and applied research, be hampered by new laws or regulations forcing them to pay taxes on some or all of their small earnings, some of them, in self-defense, would choose to pursue the profit making route.

A change to profit motivation would simply bring many of the present, non-profit institutions into direct competition with the many profit making laboratories, to which they are now essentially complementary, rather than competitive.

The private, profit-motivated laboratories today serve a very useful function. They are available to industry to perform whatever specific task may be required. However, the necessity of their earning a profit restricts their ability to freely originate and select their projects by scientific criteria.

In essence, enacting the proposed legislation would be analogous to a man hobbling one of his best horses and then betting on it to win a race. In view of the extreme importance of the race which America now faces, such hobbling would be a most injudicious act.

Highly Intimate Blends in 1 to 2 Minutes

Blends while discharging; No segregation or flotation

Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials – within 3 to 5 minutes of start of charging.

Six *complete* blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat – is highly effective yet gentle and safe even with explosives.

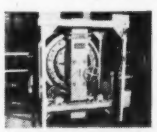
Receiving
Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way right from start of charging.

Discharging
Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.

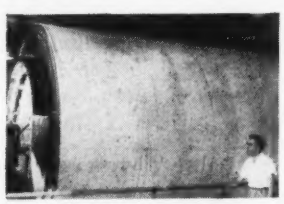
Self-cleaning, dust-sealed drum; one-man accessibility

Operation of Sturtevant Blenders is self-cleaning – drum interiors are completely dust-sealed. For inspection of all models, one man simply loosens a few lugs to remove manhole cover – quickly and easily.

Nine standard models with capacities to 900 cu. ft.



10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N. C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

Fully or semi-automatic, or manually controlled operation

Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs – can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (Bulletins also available on Mixers, Air Separators, Micronizers, Crushers and Grinders.) Write today. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

Check 1046 opposite last page

Shell Goes Ahead on Norco Glycerine, Acrolein Plant

Shell Chemical Corporation has awarded contracts for constructing remaining facilities in the glycerine production program at its Norco, La., plant. One unit will produce acrolein. A second will make glycerine, using acrolein and hydrogen peroxide from a unit that company completed earlier this year.

Norco plant, when completed late next year, will produce about 35 million pounds of glycerine a year, plus substantial quantities of acrolein. Cost of this phase of the program is estimated to top $10 million.

Shell's glycerine production at its Houston, Texas, plant will be decreased when Norco comes on stream. Feedstock for Houston, mostly allyl chloride, will be shifted into production of other products, such as epoxy adhesives and plastics.

Engineering contracts for the Norco acrolein unit went to The Lummus Co. Ralph M. Parsons got the contract for the glycerine unit, and The Fluor Corp. the off-site facilities.

Olin Mathieson and Sun Oil have exchanged letters of intent to form joint company to build and operate a 73,000-ton/yr urea plant. Proposed plant will be at Marcus Hook, Pa., where Sun has one of the largest refineries in the world.

Armour and Company's Chemical Division put on stream a new ethoxylation unit in July, at its chemical plant in McCook (near Chicago), Illinois. The unit gives Armour a more complete product line, better service, and price reduction.

Compounds made by ethoxylating: fatty acids, diamines, amides, amines, and quaternary ammonium salts.

Dow Chemical's Texas Division (Freeport) has developed new processes for production of three grades of glycerine which are purer than their previous high-quality counterparts. A new plant recently placed on stream also doubles capacity for synthetic, 96% USP, and 99.5% USP grades.

Process is Dow's. Raw materials, all basic to Dow, are propylene, chlorine, and caustic soda.

Michigan Chemical Corporation has completed plans for a new seawater-magnesia plant at Port St. Joe, Florida. Design capacity is 125-150 tons/day, but provision is made for subsequent enlargement to 300 tons/day. High-purity chemical and refractory grades of magnesium oxide will be produced.

HEF, Inc., jointly owned subsidiary of Hooker Chemical Corporation and Foote Mineral Company, has launched construction of a multimillion-lb/yr plant for production of ammonium perchlorate, oxidizer in solid rocket and missile propellants. New facility is adjacent to Columbus, Miss., plant of Hooker. It will be able to produce lithium perchlorate should demand arise.

Hooker has just authorized another million-dollar expansion of its sodium chlorate production at Columbus, to be completed by April 1959. This is the third major expansion since plant began operation in late 1954, and will more than double original 12,000-ton/yr capacity.

Consolidated Chemical Industries, Division of Stauffer Chemical Company, just started producing anhydrous hydrogen chloride in a new plant at Fort Worth, Texas. The chloride, 99.9% pure, will serve petroleum refineries and chemical manufacturers in the South, Midwest, and East.

B. F. Goodrich Chemical Company has already announced plans to expand its new Henry, Illinois, General

...a widely miscible non-aqueous solvent, azeotroping agent, Lewis-acid catalyst, intermediate, and flame-retardant additive—

METHYL BORATE

1

Except for its very ready hydrolysis by atmospheric moisture, Methyl Borate, $B(OCH_3)_3$ is a quite stable compound. It does not decompose thermally below 400°C.

We'd like to discuss with you one or more of these suggested uses of Methyl Borate: as a non-aqueous solvent, as a catalyst in organic synthesis, in azeotropic distillation, as a flame-retardant additive, to prepare substituted boranes, as a catalyst for Diborane reactions, as a neutron absorber and detector, as a stabilizer for sulfur trioxide. Write for Technical Bulletin C-510.

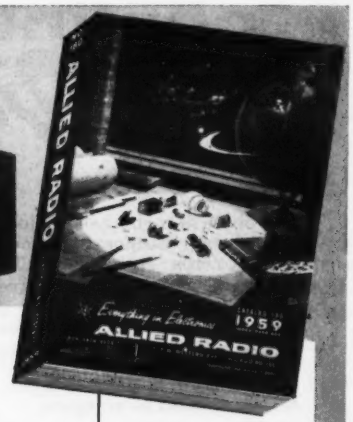
Phone: FOrest 4-1130 TWX: 117 Perrysville, Pa.

GALLERY CHEMICAL COMPANY
PITTSBURGH 37, PENNSYLVANIA

Check 1047 opposite last page

free! send for the most widely used
ELECTRONIC SUPPLY GUIDE

ALLIED'S COMPLETE 452-PAGE 1959 CATALOG



your best buying guide to the world's largest stocks of
ELECTRONIC SUPPLIES FOR INDUSTRY

Simplify and speed your purchasing of electronic supplies and equipment: send your orders to us for fast shipment from the world's largest stocks of electron tubes (all types and makes), transistors, test equipment (see our money-saving KNIGHT-KITS), audio equipment and electronic parts. Our expert Industrial supply service saves you time, money and effort. Send today for your FREE 1959 ALLIED Catalog—your *complete* Buying Guide to quality Electronic Supplies for Industrial and Communications use.

- Transistors & Diodes
- Relays & Switches
- Transformers
- Tubes (All Types)
- Test Equipment
- AN Connectors
- Racks & Chassis
- Tools & Hardware
- KNIGHT Public Address & Paging Systems

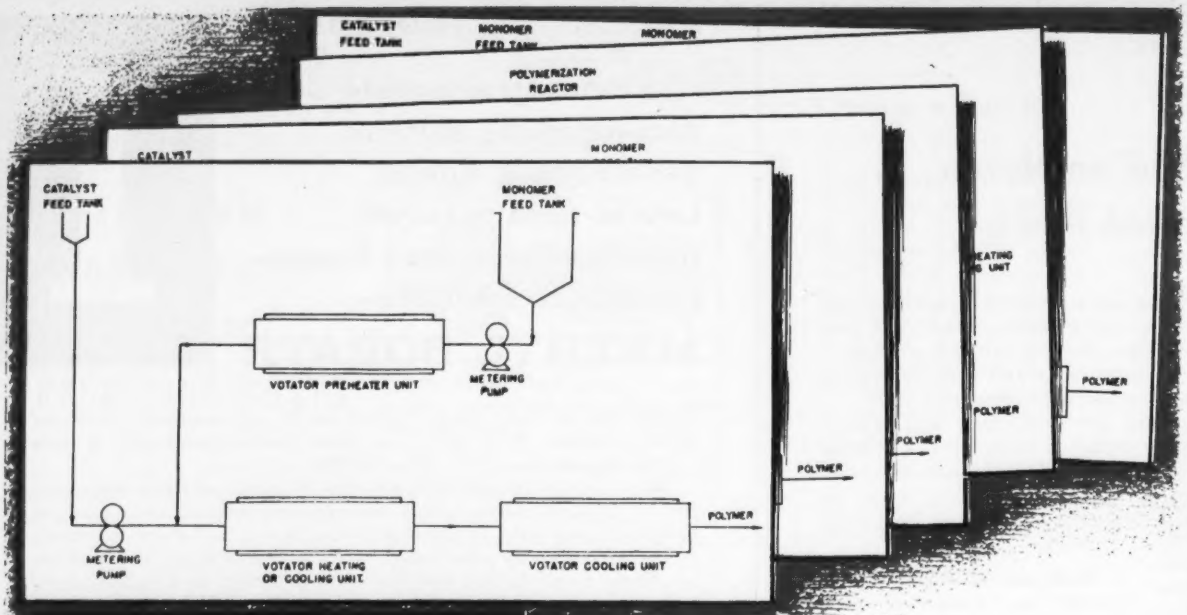
OEM prices available on quantity purchases

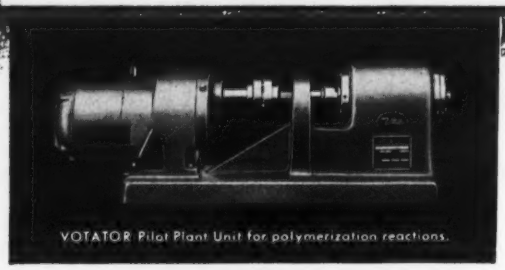
ALLIED RADIO
100 N. Western Ave., Dept. 72-J8
Chicago 80, Illinois

Send for FREE Catalog

OUR 38th YEAR

Check 1048 opposite last page





VOTATOR Pilot Plant Unit for polymerization reactions.

There are many ways to get the many advantages of

continuous polymerization

with Votator® Heat Transfer Apparatus

The above flow chart shows just one of the many systems which can be used for continuous polymerization reactions with VOTATOR* Heat Transfer Equipment. These scraped-surface heaters, coolers and reactors are combined with other VOTATOR components to give you *optimum results for your specific polymerization requirements.*

You get these performance advantages with VOTATOR Polymerization Equipment:

1. **Low spread in analysis.**
2. **Controlled time-temperature relation.**
3. **No "end to end" mixing.**
4. **Vigorous agitation — intimate contact.**
5. **Highly efficient heat transfer — no fouling.**
6. **Excellent temperature control.**
7. **Scraped-surface handling of high viscosities.**
8. **Unequalled product uniformity.**
9. **Minimum labor and floor space requirements.**

We will study your operations and make recommendations to match your needs. Call our nearest office.

*VOTATOR and THERMEX—Reg. U.S. Pat. Off.

GIRDLER ENGINEERS AND SUPPLIES:

Complete plants — Complete systems
System components — Pilot sized systems
Pilot sized components

GIRDLER PROCESS EQUIPMENT DIVISION
CHEMETRON CORPORATION
Louisville 1, Kentucky
Manufacturers of "VOTATOR" and "THERMEX" Processing Apparatus
Sales Offices: Louisville • New York • Chicago
Marietta (Georgia) • San Francisco

CHEMETRON

Check 1049 opposite last page

Chemicals plant. Expansion will provide facilities for making an antiozonant chemical for rubber and petroleum industries. Construction begins in September; completion scheduled for spring of 1959.

Dewey and Almy Chemical Company, Division of W. R. Grace & Co., has broken ground near Owensboro, Ky., for a new organic chemicals and battery separator plant. Organic chemical facilities will more than double company's capacity for vinyl acetate polymer and copolymer emulsions and styrene-butadiene latices. It is scheduled for completion early next year. Separator plant should be completed late this year.

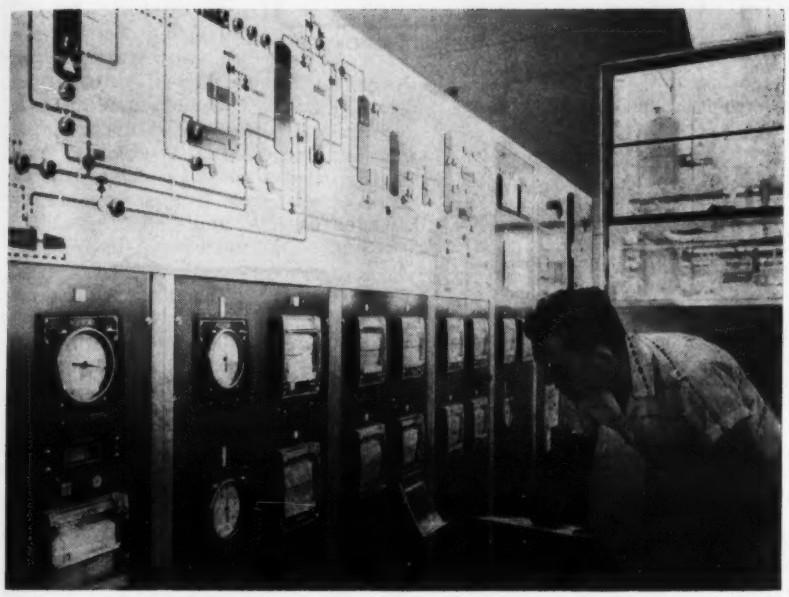
Company recently expanded its capacity in organic chemicals and separators at its Acton, Mass.

Union Carbide Chemicals Company, division of Union Carbide Corporation, is "recasting" its plans to expand production of ethylene oxide and ethanol. Most directly affected is the petrochemical project Carbide had announced for construction at Putnam, W. Va. Originally slated for completion in 1960, the project's target date has been deferred for further engineering and economic studies. While too early to predict outcome of the studies, best estimates indicate construction delay of two to three years.

Recent process developments have substantially increased output capacity of Carbide's existing plants for these chemicals (a jump of 60 million lb/yr in firm's ethylene oxide capacity, and 20 million gal/yr of ethanol at its Texas City plant).

But Carbide admits that current business conditions have slowed consumer demand. Moreover, when ethylene oxide units being built in Puerto Rico and England by Carbide-affiliated companies come on stream this fall, they largely will be supplying foreign markets hitherto supplied by Carbide's US operations.

However, the Corporation still expects to invest $150 million in expansion this year, as previously announced.



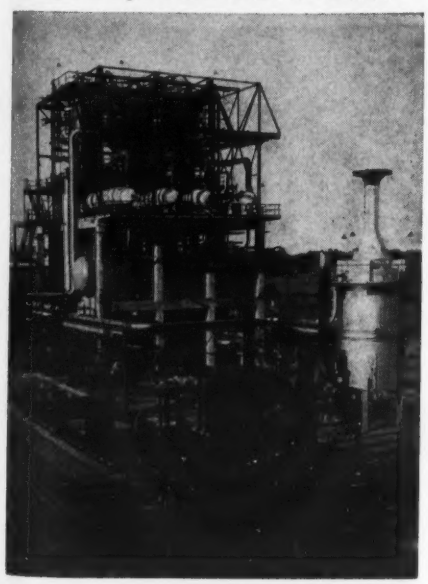
Electronic control panel for ethylene oxide-glycol plant

SIMPLICITY and STABILITY Obtained With DIRECT-OXIDATION PROCESS

Wyandotte Chemicals ethylene oxide plant near Baton Rouge is first commercial unit to go on stream using Shell process, which offers high efficiency with single reaction stage

GORDON WEYERMULLER, Petrochemical Editor
with **JOSEPH SIMON,** Project Manager
Wyandotte Chemicals Corporation, Geismar, Louisiana

Ethylene oxide reactors at Wyandotte plant. Furnace at right is used to heat the reactors



Shell direct-oxidation process for ethylene oxide employed at the new Wyandotte Chemicals plant in Louisiana will provide a number of advantages. This is indicated by ease with which plant went on stream and operating data obtained so far.

Use of oxygen instead of air eliminates handling a large volume of inert gases such as nitrogen and carbon dioxide through a considerable portion of process. Since plant doesn't handle anything it doesn't use, it is simpler and less equipment is required. Scanning instrument used for checking reactor temperatures helps to maintain process stability.

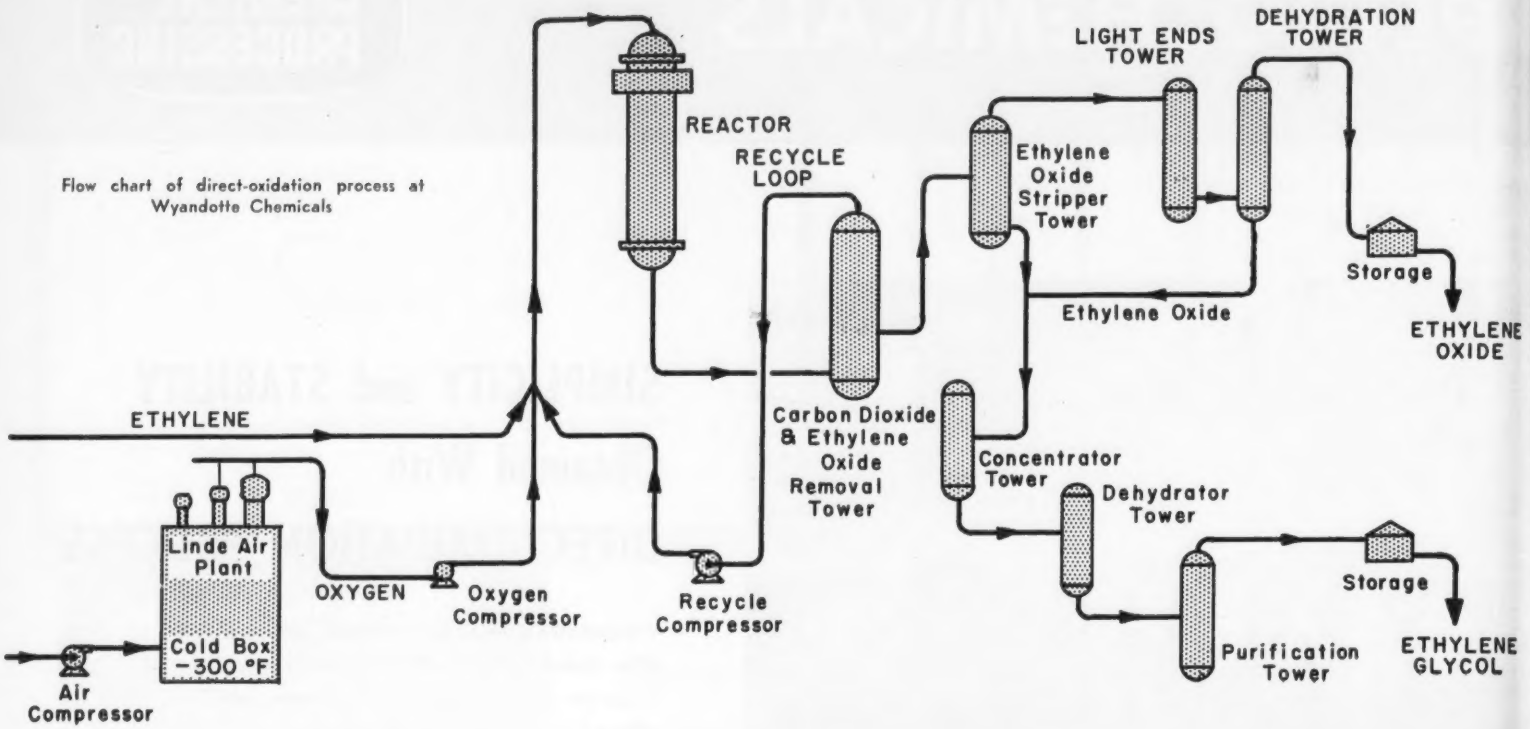
High yields result with the direct-oxidation process. Yields so far at the plant are as anticipated. One reason for high yield is that ethylene loss is less through elimination of waste gases since there is little waste gas present. Waste disposal is less of a problem than with chlorohydrin process.

Process

High-purity ethylene for reaction is piped to plant from the Esso refinery 35 miles away. Oxygen for reaction is furnished by a German Linde unit. This unit provides 150 tons of oxygen per day. German Linde oxygen plant was selected because of long period of successful operation this type of unit has had, having been in commercial use for many years. About 200 such units are in use in the world today. Oxygen plant uses a minimum of power and is safe. Air intake is 300′ from unit to eliminate possibility of contaminants getting into air, with resultant hazard.

Ethylene and oxygen pass to reactors. Oxygen can be closely controlled in total gas passing to reactor. Mixture of ethylene and oxygen goes through vertical tubes which contain the catalyst. Catalyst is silver on an inert carrier.

Reaction takes place at a high temperature and a moderately high pressure. A coolant flows around outside of reactor tubes. At Wyandotte three reactors are used to manufacture 60 million lb of ethylene oxide per year. Each reactor operates independently. Steam of 600 psi pressure is furnished to turbines used to drive compressors in re-



Flow chart of direct-oxidation process at Wyandotte Chemicals

Direct-oxidation Process

From preceding page

actor area of the plant.

After leaving reactor, gases are circulated through a CO_2 and oxide removal system. Remaining gases go to Carrier compressor where pressure is increased and unreacted gases sent through reactor again.

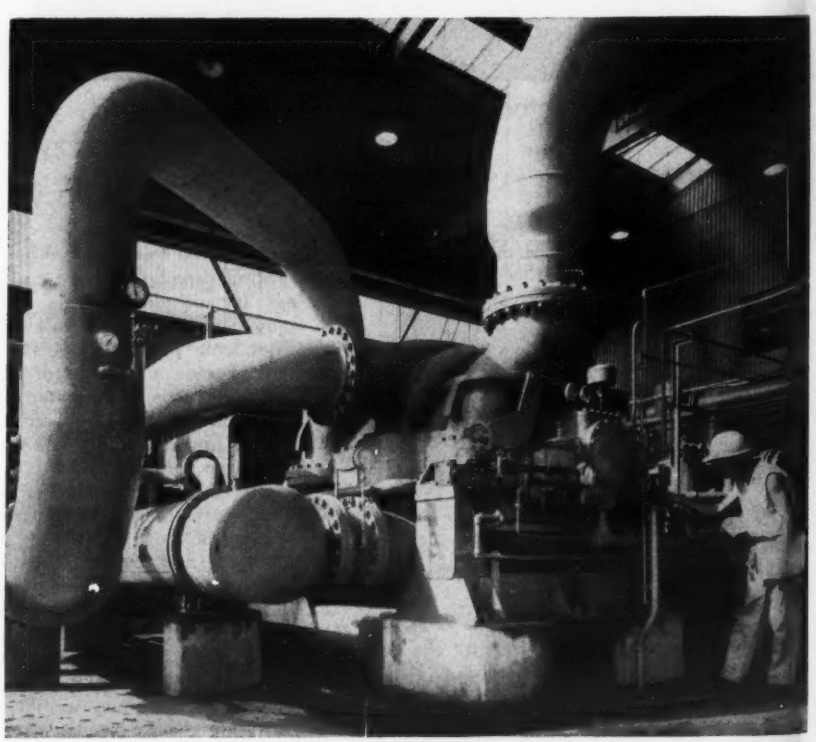
About 80% of the ethylene oxide manufactured is converted to ethylene glycol by pressure hydration, rather than the conventional acid hydration method. A high pressure with a high temperature is used during hydration step. Plant does not require extensive use of alloys.

Ethylene oxide and ethylene glycol made so far at the plant have been well within specifications. Wyandotte engineering personnel feel that the direct-oxidation process will produce material of competitive quality.

Wyandotte plant is the first commercial unit in the world to go on stream using the Shell direct-oxidation process. Soon to follow will be a similar plant of same size to be operated by Calcasieu Chemical Corporation, subsidiary of Petroleum Chemicals, Inc. It is also in Louisiana, being located at Lake Charles. A third plant employing the Shell direct-oxidation process, also of the same size, is being built at Partington, England for Petrochemicals Ltd., one of the Royal Dutch Shell group companies. It will also be placed in operation in the near future.

(Wyandotte ethylene oxide and ethylene glycol plant, and the other two direct-oxidation plants soon to go on stream, were engineered and constructed by The Lummus Co., 385 Madison Ave., New York 17, New York.)

Check 1050 opposite last page.



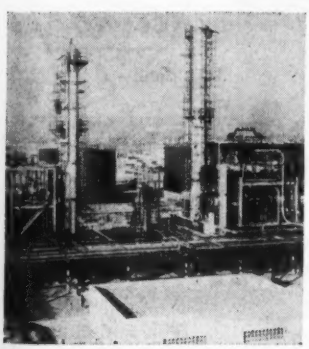
Centrifugal compressor used in Linde oxygen plant

Startup Le Havre plant for detergent alkylate

Covering approximately five acres of a large industrial site a few miles east of Le Havre, France, a new plant is producing detergent alkylate, the basic raw material for a wide variety of household and industrial detergents.

Owned and operated by a new chemical company, Societe Petrosynthese, the plant has an initial annual capacity of 32 million pounds. Societe Petrosynthese was formed by three partners, Oronite Chemical Co. and two French firms — Compagnie Francaise de Raffinage (CFR) and Atlantique-Progil-Electrochemie.

The Le Havre site was chosen because of its easy accessibility to water and rail transportation, and its proximity to raw materials. Propylene



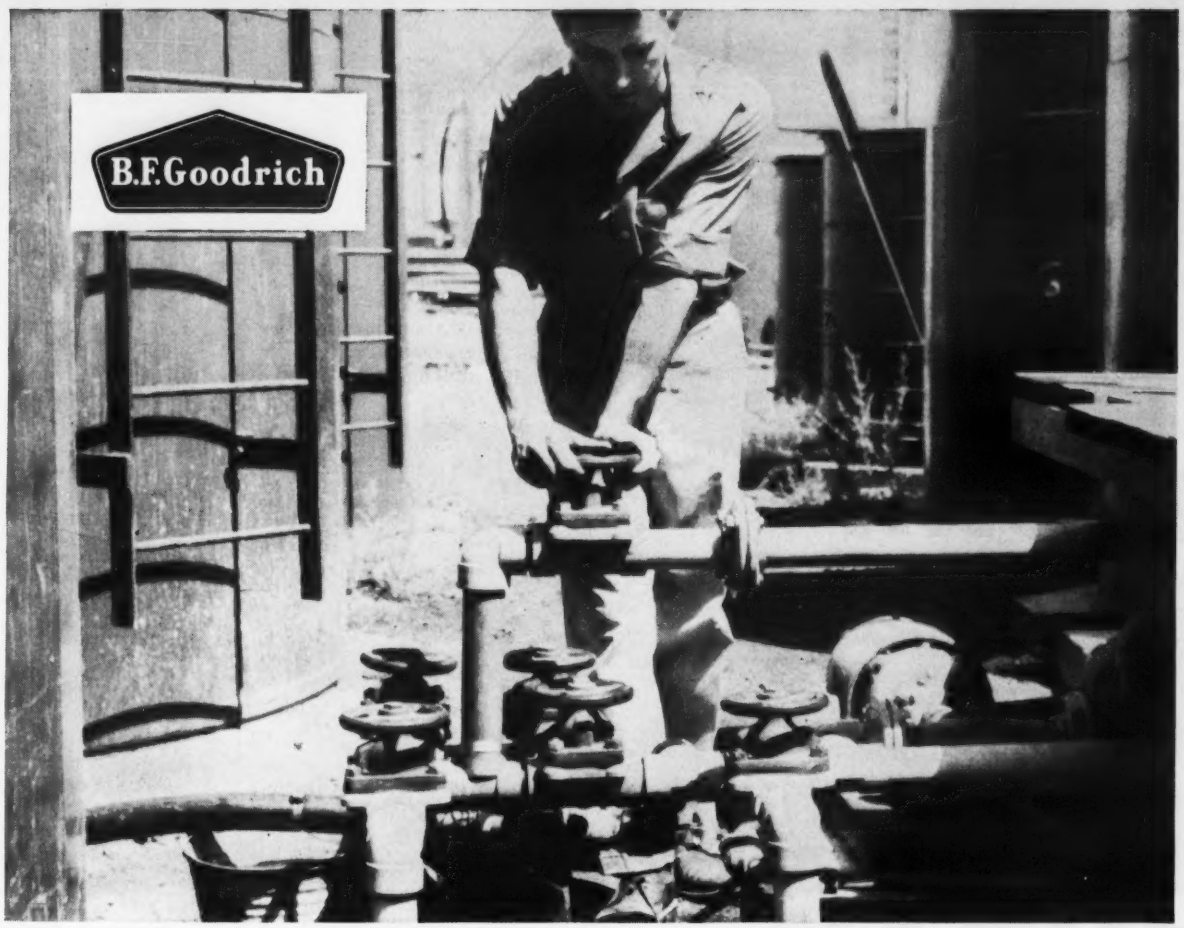
French petrochemical plant for the production of detergent alkylate

polymer, a principal material in the manufacture of detergent alkylate, will be supplied by CFR's Gonfreville refinery, located approximately two miles from the new plant.

(Information courtesy of Oronite Chemical Co., 200 Bush St., San Francisco, Cal.)

Petrochemical study of 20 pages made by brokerage firm contains valuable information on products and companies in the United States involved in development and prospects for future growth. Brochure on petrochemicals — Harris, Upham & Co., Dept. S, 120 Broadway, New York 5, N.Y.

Check 1051 opposite last page.



NOW FARMERS GET LIQUID FERTILIZER

thanks to B.F.Goodrich Koroseal pipe

THE Washington Farmers' Co-operative Association in Seattle decided to launch something new—big-scale distribution of chemical liquid fertilizers. One of their toughest problems was to get the basic ingredients, such as green phosphoric acid and traces of nitric and hydrochloric acid, from storage to mixing tanks, without corroding the piping.

For a year the Farmers' Association experimented. Ordinary metal pipe couldn't take the internal corrosion and external weathering. Then the solution: B.F.Goodrich Rigid Koroseal polyvinyl chloride pipe!

Now, thanks to the remarkable corrosion resistance and unusually long-wearing qualities of Koroseal, the Association's liquid fertilizer stations are enjoying continuous trouble-free operation.

Rigid Koroseal pipe has solved countless problems for a wide variety of industrial applications. Easy to install, it can be threaded, cut, welded, drilled. It has excellent insulation properties, is unaffected by most alkalies and acids. It is completely inert in the presence of oil, alcohol and salt solutions. Koroseal will not support combustion and never needs to be painted.

For information on how B.F.Goodrich Koroseal can make your operations more efficient, fill in and mail the coupon below. *B.F.Goodrich Industrial Products Company, Marietta, Ohio.*

B. F. GOODRICH
INDUSTRIAL PRODUCTS CO.
MARIETTA, OHIO

B.F.Goodrich Industrial Products Co.
Dept. CP-9, Marietta, Ohio

Please send me free booklets on:
☐ Rigid Koroseal Pipe
☐ Rigid Koroseal Sheet

Name_____
Company_____
Address_____
City_____ Zone____ State_____

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich ***Koroseal rigid vinyl products***

Check 1052 opposite last page

STOP

PUMP

WEAR

Hard-face pump parts with the Colmonoy Spraywelder

Your pump plungers, pistons, rings, bushings—all your pump parts—will last longer with corrosion and abrasion resistant Colmonoy alloy hard-facing.

You apply these alloys fast—with the Colmonoy Spraywelder. This powder spraying unit produces smooth overlays, within .010" of desired size. They are welded to the base metal and require a minimum of finishing.

You'll save handsomely by either eliminating expensive corrosion resistant metal components, or by eliminating the time consuming hand application of hard-facing rod and the attendant difficulties in distortion and machining. Write today for more information on how you can use the Spraywelder.

HARD-FACING ALLOYS

WALL COLMONOY CORPORATION

9365 JOHN R STREET DETROIT 3, MICHIGAN

BIRMINGHAM • BUFFALO • CHICAGO • HOUSTON • LOS ANGELES
MORRISVILLE, PA. • NEW YORK • PITTSBURGH • MONTREAL • GREAT BRITAIN

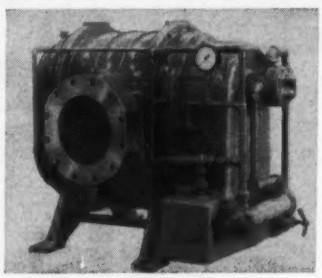
Check 1053 opposite last page

PETROCHEMICALS

Blower impeller design saves up to 40% in floor space

Uses: For handling air or gas.

Features: Vertical arrangement of impellers providing horizontal inlet and discharge connections saves as much as 40% in floor space. Design also permits safe handling of entrained liquids and more quiet operation.



Blower handles entrained liquids safely

Description: Blower utilizes basic rotary positive principle developed by manufacturer. Delivery of oil-free air or gas is assured by double seals on shafts — a multiple labyrinth seal plus a positive oil seal.

Thirty-six sizes are offered to cover a capacity range from 2000 to 14,000 cfm at 6 psig, and from 1500 to 8000 cfm at 10 psig.

(Type RAS blowers are product of Roots-Connersville Blower, one of the Dresser Industries, Inc., 900 West Mount St., Connersville, Ind.)

Check 1054 opposite last page.

Petrochemical engineering

World-wide activities of company designing and constructing chemical and petrochemical plants are discussed in 20-page booklet. Included is a description of processes offered for acetylene, ammonia, hydrogen, methanol, nitric acid, sulfuric acid, and urea. Information on gas scrubbers is also given. Chemico booklet — Chemical Construction Corp., 525 West 43rd St., New York 36, N.Y.

Check 1055 opposite last page.

panel mounted Pyrometers with Alnor® Accuracy

Alnor Pyrometers are designed to give consistently accurate temperature readings under the most severe conditions of vibration, dirt and corrosive atmosphere. Sturdy, laboratory-precise movements are cushioned in fume-proof, splash-proof welded steel cases in front of board or flush type mountings. Six series available for single circuit up to 31 circuit applications. Eleven standard ranges covering 0-300° F. to 0-3000° F. or centigrade equivalents.

Single-circuit series data is covered in Bulletin 4371.

Multi-circuit series data covered in Bulletin 4361.

Circle number you wish; attach this ad to your letterhead, and mail to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Alnor

Check 1056 opposite last page

TANK-O-METER

FOR MEASURING TANK CONTENTS ANY DISTANCE AWAY

TANKS MAY BE...

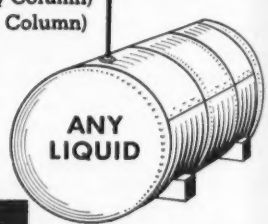
• BURIED OR ELEVATED
• OPEN • CLOSED • VENTED
• UNDER PRESSURE • UNDER VACUUM
• UNDER PRESSURE AND VACUUM

ACCURATE • RELIABLE • DURABLE

Also gauges for:

Barometric Pressure (Mercury Column)
Absolute Pressure (Mercury Column)
Pressure and Vacuum
Differential Pressure
Inclined Manometers
for draft, pressure or differential pressure.

SEND FOR BULLETINS



Uehling INSTRUMENT CO.

488 GETTY AVE.
PATERSON, N. J.

SINCE 1896

Check 1057 opposite last page

THAT'S INTERESTING

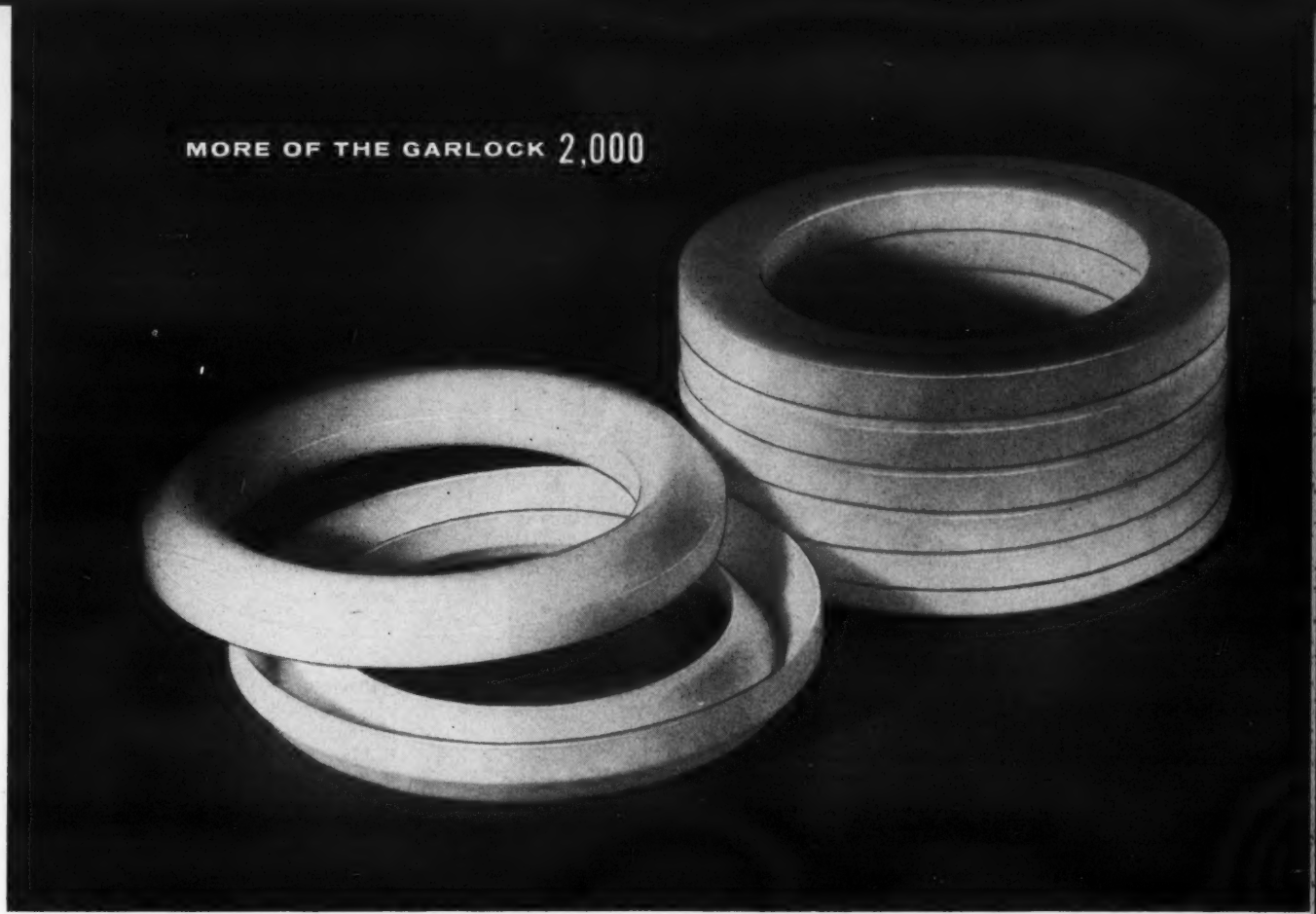
Not static

The roar coming from the hi-fi system at Sandia Corp. is not caused by a blown-out tube, it's on purpose. Synthetic rocket roar is made by mid-range hi-fi for experimental plane wave sound system. Purpose—help engineers design electromechanical components to withstand high-intensity sound of jet and rocket engines. (*Industrial Research Newsletter,* Armour Research Foundation)

Seeing red — or green?

The retina of the eye does not have a uniform color response. By passing a small point of light over surface of fovea, that part of retina directly in axis of vision, it was found that when light source was yellow, it registered red in some positions, green in others, for example. (*Dyelines,* American Cyanamid Co.)

For more information on product at right, specify 1058 see information request blank opposite last page.



GARLOCK CHEVRON* Packings Seal Positively, Resist Chemical Corrosion from –110° to +500°F

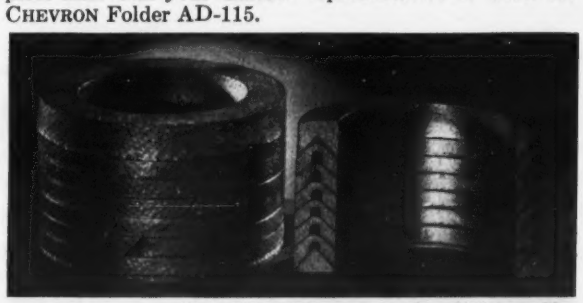
Designed specifically for the countless reciprocating pump and valve stem applications in chemical processing, Garlock CHEVRON packings made with TEFLON**, Kel-F***, or Viton** do a better job of positive sealing—with less downtime and maintenance—for two reasons:

1. CHEVRON construction. Using an exclusive hinge-like design, CHEVRON packings permit free operation with minimum friction at all pressures. As pressure increases, the packing rings tighten to prevent leakage; as it declines, the rings ease off to permit free movement of the rod, ram, or piston. This means that, once initial adjustment of the gland is made, no further regulation is necessary to compensate for pressure variation.

2. Chemically-inert Teflon, Kel-F, or Viton. Made of chemically-inert Teflon or Kel-F, CHEVRON packings have a very low coefficient of friction, and can be kept in continuous service at temperatures from −110° to +500°F with good conformability. Made of Viton, CHEVRON resists most solvents and acids to 600°F without loss of physical characteristics.

Garlock CHEVRON packings made with Teflon (Style 8764 shown above) are recommended for chemical processing where contamination and decay are the main problems. On less corrosive applications, Garlock CHEVRON packings of cotton duck and oil-resistant neoprene (illustrated below) are suggested. CHEVRON packings with Teflon are part of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for every need. The only complete line. Call your Garlock representative or write for CHEVRON Folder AD-115.

*Garlock trademark **Du Pont trademark
***Registered trademark, 3M Company



Style 431 CHEVRON assures low friction, positive seal, lasts longer than ordinary V-type packings, and works efficiently in shallow stuffing boxes.

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.
FOR PROMPT SERVICE, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Molded and Extruded Rubber, Plastic Products

*means Good Business...

This stainless steel evaporator was especially designed for Southern Nitrogen Corporation in Savannah, Georgia. With this economical evaporator, ammonium nitrate is concentrated to 96%. This is another example of Goslin-Birmingham's ability to solve difficult processing problems by applying advanced engineering principles and modern fabrication methods and facilities.

GB

GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

FILTERS • EVAPORATORS
PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS

Check 1059 opposite last page

Coal-based activated carbon boosts butadiene production

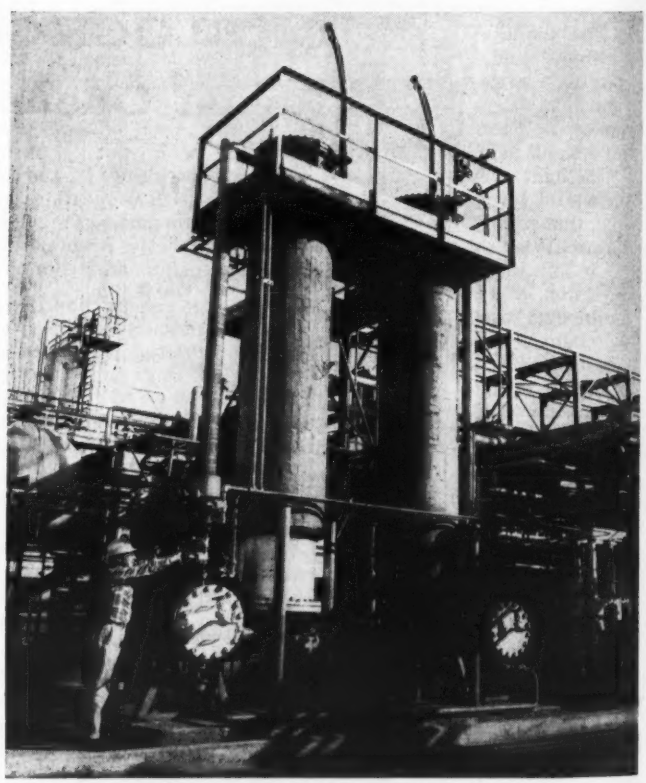
By switching to specially prepared carbon, petrochemical plant doubles volume of solvent treated and improves its selectivity

W. B. P'POOL
Assistant Production Supt.
Copolymer Rubber & Chemical Corp.
Baton Rouge, Louisiana
With **CP Staff**

Problem: An activated carbon originally used for solvent purification at Copolymer Rubber & Chemical Corp., Baton Rouge, La., permitted a maximum solvent flow rate of only six gallons per minute.

In the production of butadiene at the plant, cuprous ammonium acetate solution (CAA) is used to selectively absorb and separate butadiene from a mixed hydrocarbon stream of butadiene, butanes, and butenes. Butadiene is then stripped from the solution by distillation and the CAA is returned to the process for repeated use.

Recirculated in this manner, cycle after cycle, the CAA gradually becomes contaminated with polymers of acetylene and diolefins which im-



Activated carbon towers at Copolymer Rubber & Chemical Corp.

pair its selectivity, cause foaming, and reduce the percentage of butadiene absorbed. To remove these polymers, a portion of the CAA stream is passed over granular activated carbon between each cycle. In the past, inability of the carbon used to keep these polymers at acceptable levels kept butadiene purification section from operating at design capacity. This, in turn, lowered plant production capacity.

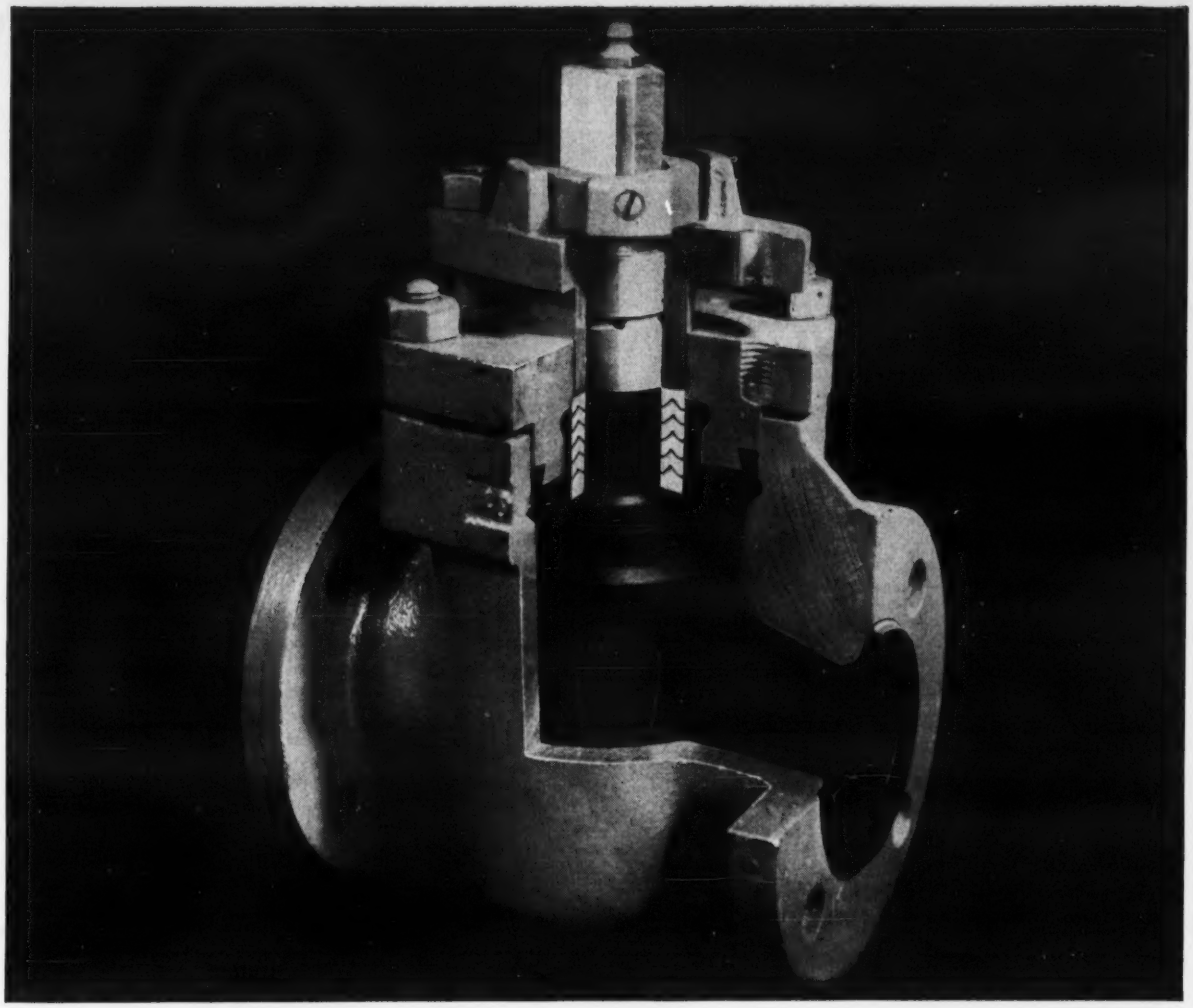
In the purification process, the impure butadiene stream is treated with a cold solution of CAA in a series of contactors and gravity separators. Any polymer in CAA at this point can cause foaming and emulsification, thereby preventing sharp separation of the butadiene from the butanes and butenes.

Following the last gravity separator, the butadiene-laden CAA stream passes to a stripper where the butadiene is separated from CAA by distillation. It is the heat in this step that causes the formation of troublesome acetylene and diolefin polymers in the CAA solution. Here again, foaming can occur if the polymer concentration gets too high, thereby reducing the efficiency of the distillation step.

To handle the CAA purification, two activated carbon towers (30″ diameter by 17′ high) were installed at the Copolymer plant in 1954. Activated carbon originally used permitted only the low flow rate of six gpm through each tower operating in parallel. With an 11-day cycle between carbon changes, polymer content in CAA was maintained at about 0.15 g/l. Tower efficiency could have been improved by using lower flow rates. Reduction of the polymer content of the main stream, however, would have required installation of additional towers and filters at a substantial capital expenditure.

Solution: About two years ago, Copolymer changed to a specially prepared SGL carbon with a higher activity

To next page



You can see why Saran Lined Pipe costs so little per year of service

Saran anchored within a steel casing safely conveys corrosive liquids for years of trouble-free service

There's something special about this valve. It's saran lined and has a Teflon V-ring packing for easier opening and closing and more perfect sealing with less pressure. And yet, the fact that valves like this are stock items is another example of why saran lined piping systems are more economical to install.

Immediate availability of Saran Lined Pipe, valves, pumps and fittings means there's no waiting. And Saran Lined Pipe can be cut and threaded right on the job with conventional tools. This lower fabrication cost, combined with the long life of corrosion-resistant saran, means that complete saran lined piping systems cost less in the long run.

Saran Lined Pipe with the new gray liner gives trouble-free service under operating pressures from full vacuum up to 300 psi and temperatures from -20° F. up to 200° F.

Send the coupon today to learn how you can save by installing a complete corrosion-free piping system with Saran Lined Pipe, valves, pumps and fittings. And be sure to ask about Saraloy® 898 tank linings. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. 2003B-1
2415 BURDETTE AVENUE
FERNDALE 20, MICHIGAN

Please send me information on: ☐ Saran Lined Pipe, fittings and valves ☐ Saran lined centrifugal pumps ☐ Saraloy 898 chemical-resistant sheeting

Name_____ Title_____ Company_____

Address_____ City_____ State_____

YOU CAN DEPEND ON DOW

Check 1060 opposite last page

COST REDUCTION* AND INCREASED PERFORMANCE

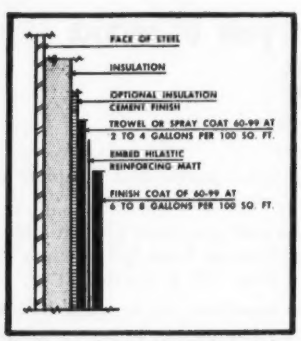
with *hi LASTIC* mastic and matt for Thermal Insulation Protection

REDUCE

1. DRIED FILM THICKNESS
2. MASTIC APPLICATION COST
   (HiLastic—first fibrated emulsion mastic suitable for spray application)
3. RE-INFORCING MEMBRANE APPLICATION COST
   (HiLastic Matt . . . flexible and easily imbedded. No re-inforcing imprint.)

INCREASE

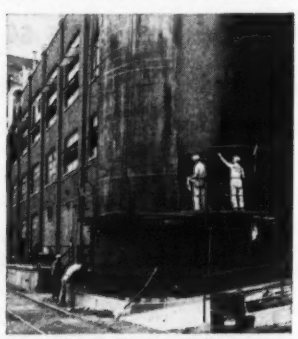
1. FLEXIBILITY
   Eliminates expansion cracks
2. RESISTANCE TO PHYSICAL ABUSE
   New concept of flexible reinforcing membrane gives added strength to mastic film.
3. DURABILITY
   Weathering resistance improved with less film thickness.


FACE OF STEEL
INSULATION
OPTIONAL INSULATION CEMENT FINISH
TROWEL OR SPRAY COAT 60-99 AT 2 TO 4 GALLONS PER 100 SQ. FT.
EMBED HILASTIC REINFORCING MATT
FINISH COAT OF 60-99 AT 6 TO 8 GALLONS PER 100 SQ. FT.

Application drawing is not made to scale.

HERE'S HOW

HERE'S RESULT



Foster HiLastic Mastic and Matt as applied to tower at The Mead Corporation plant, Chillicothe, Ohio.

*Actual job figures available with insulation contractors indicate 25% to 35% reduction in cost of applied mastic finish.

foster COATINGS • SEALERS • ADHESIVES for thermal insulation

BENJAMIN foster CO.
Division of Amchem Products, Inc.
4635 W. GIRARD AVE. • PHILA. 31, PA.

SOLD BY AMERICA'S LEADING INSULATION DISTRIBUTORS AND CONTRACTORS

Check 1061 opposite last page

which is made from coal.

Measurement of activity of coal-derived carbon is indicated by its iodine number of 1000 and molasses number of 215. Carbon formerly used had an iodine number of only 650 and molasses number of 152. Iodine number is milligrams of iodine adsorbed by one gram of carbon from a standard test solution. Molasses number is an index of color removed per gram of carbon when tested on standard molasses solution.

SGL carbon has an apparent density of 0.46 g/l compared to 0.24 for former product. Higher activity per gram, coupled with higher density of coal-derived carbon, allows more activity to be placed in a given volume, such as the carbon towers at Copolymer.

Mesh size of specially prepared carbon is 8x30 compared to 4x12 for other carbon. Abrasion number is 89, compared to 56 for former material. As shown by abrasion number, coal-derived carbon is harder than other product and hence, is less likely to crumble or break into small particles during handling and use.

Results: By changing to the specially prepared carbon, Copolymer has been able to double the volume of CAA treated. Operating cycle between carbon changes has been extended to 44 days, compared to 11 days when other carbon was used. Labor expense for carbon changes has been cut by 75%. Foaming problems have been completely eliminated, with contamination of CAA reduced.

Maximum polymer content of CAA now runs 0.05 g/l, compared to 0.15 with former carbon. This gives CAA far greater selectivity. Coal-derived carbon has provided a 17% increase in butadiene purification capacity — without capital investment.

Even though the coal-derived carbon is furnished in a smaller particle size than the other material average pressure drop through a 17′ tower of carbon has only been half as great as formerly — 5 psig against 10. This is undoubtedly

PUMPING MOLTEN CHEMICALS?

write TABER

Whatever your pumping needs .. why not put it up to Taber .. long experienced pump specialists. Vertical pump illustrated, 19,478, for pumping molten chemicals. Horizontal pump, 6043, handles black liquor, caustic, etc., in evaporator service; or transfers fluids under vacuum.

WRITE, ON BUSINESS STATIONERY FOR BULLETIN V-837

TABER PUMP CO.
Est. 1859
291 ELM ST.
BUFFALO 3, N. Y.

TABER

Check 1062 opposite last page

due in part to the greater hardness of SGL. It has permitted the carbon towers to be operated at higher flow rates without exceeding design limitations on pressure.

Carbon towers can now be operated in series instead of parallel, which permits more efficient, counter-current use of the carbon. The new carbon's greater purification efficiency now permits Copolymer to process higher acetylene content feedstocks. This is a distinct advantage both as to cost and production flexibility.

At other plants recirculating streams are being treated with coal-derived carbon with equal success. In addition to CAA these streams include glycols, amines, sulfuric acid, and caustic soda.

(SGL coal-derived activated carbon is product of Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh 19, Pennsylvania.)

Check 1063 opposite last page.

Rotary compressor line lighter, more compact, has high efficiency

Maintenance is low, output is oil-free

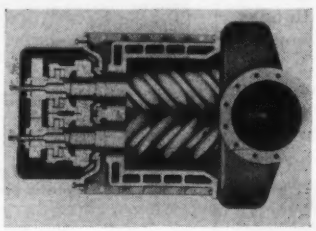
Uses: Unit is designed for continuous heavy-duty industrial service handling air, gas, or vapor.

Features: Compactness of design permits important savings in weight and floor space, and reduces foundation and installation costs. Since there is never any metal-to-metal contact between impellers or with surrounding casing, it is unnecessary to lubricate impellers. Therefore, no lubricant contamination of product and completely oil-free air, gas, or vapor is assured. Maintenance is low since there are no valves or pistons to wear.

Description: Line of positive-displacement rotary compressors is said to be first of its kind to be produced in the United States for general purpose applications. Based on a Swedish design, the compressor has proven its advantages in European service.

Standard capacity range is 800 to 13,000 cfm. The unit is a two-impeller, helical-lobe type, axial-flow, rotary machine with four-lobe power impeller and secondary impeller with six matching gaps synchronized by timing gears. Impellers rotate with a pure rolling motion and power is transmitted to secondary impeller through cushion of compressed gas.

As the impellers rotate,



Having no lubricant contamination, rotary compressor provides oil-free air, gas, or vapor

lobes and matching gaps part on the intake end creating an intake suction comparable to the suction stroke of a reciprocating piston. Further rotation isolates the interlobal space from the intake, and intermeshing lobes reduce volume and compress the gas. As leading edges of lobes pass stationary edges of discharge opening, compressed gas is forced into discharge line.

(Rotary compressors are manufactured by Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Ill.)

Check 1064 opposite last page.

Describes Udex unit

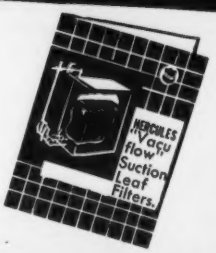
Data on company's Udex process for solvent extraction of benzene, toluene, and xylenes from refinery streams or coke-oven light oil are summarized in 12-page bulletin. Included are statistics on aromatics, production trends, flow sheet, equipment and instrumentation photos, and data on yields, estimated chemical and utility requirements, and operating cost estimates. Udex process bul — Universal Oil Products Co., 30 Algonquin Rd., Des Plaines, Ill.

Check 1065 opposite last page.

THIS FREE LITERATURE WILL HELP
SOLVE YOUR FILTRATION PROBLEM

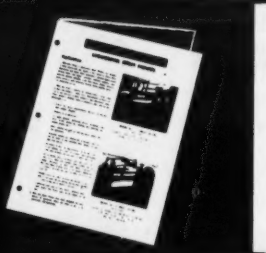
Liquid Filtration through Hercules Pressure Leaf Filters

If you have anything to filter, you need this 16 page Handbook. It illustrates and gives the complete story of the Principles of Pressure Leaf Filtration, Construction of Filters, Operation and Important Features to look for when purchasing filters.



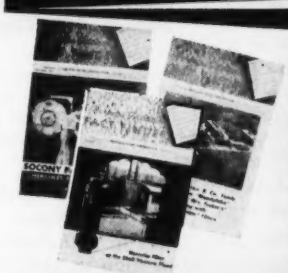
Hercules "Vacu-Flow" Suction Leaf Filters

6 page folder gives detailed information on the construction and operation of Suction Leaf Filters. Also covered are filter materials, negative pressure, filter cycle, flow rate, size of filter for various applications and the use of filter aids. A discussion of the advantages of Suction Leaf Filters including a chart of model sizes and capacities.



Industrial Sheet Filters

This 4 page folder covers the Sheet Filtration of various liquids. A wide range of sizes and models are manufactured to meet every requirement of flow rate. A detailed exploded view of filter construction and descriptions of various models are also included.



"Fact Finder" installation stories in scores of fields.

The "Fact Finder" embodies the combined experience of plant and field filtration engineers with over three decades of work with hundreds of America's leading manufacturers, in scores of fields.

Send today for installation stories covering your field.

MAIL THIS COUPON TODAY FOR FREE FOLDERS

Hercules Filter Corp., 213 Ethyl Avenue, Hawthorne, N. J.

Please send me with out obligation on my part, the following free illustrated, descriptive literature:

- ☐ 16-page handbook, Hercules Pressure Leaf Filters— "Rapidor" & "Roto-Jet."
- ☐ 4-page Folder — Industrial Sheet Filters.
- ☐ 6-page Folder — "Vacuflow" Suction Leaf Filters.
- ☐ "Fact Finder" Installation Stories.

Individual_____

Company_____

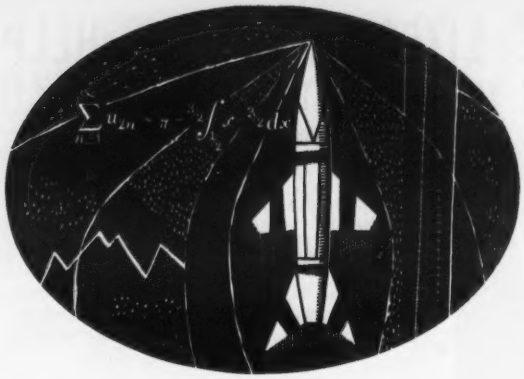
Street_____

City_____ Zone_____ State_____

HERCULES FILTER CORP.

213 Ethyl Avenue Hawthorne, N. J.

Check 1066 opposite last page



a new storehouse of knowledge

for the "age of space" problems . . . MICROCARDS*

MICROCARDS can bring you reference data not otherwise available – foreign journals, exhaustive government research reports, limited-edition monographs – on easy-to-use cards. MICROCARDS also provide an economical way to record your own research findings, in perfect order, for circularizing as widely as needed.

* A registered trademark. A MICROCARD is an opaque 3″ x 5″ card on which we record photographically, in miniature, as many as 80 pages of full-size documents. You can keep a complete library at hand in an ordinary card file, locate particular references easily and read them clearly . . . with a magnifying MICROCARD reader. A great amount of original source material is already available from MICROCARD publishers. Their current catalogs are available to you on request.

microcard

MICROCARD CORPORATION
West Salem, Wisconsin

FREE BROCHURE

Write today for more information: What's now available on MICROCARDS, where you can get your own material converted to MICROCARD FORM.

Check 1067 opposite last page

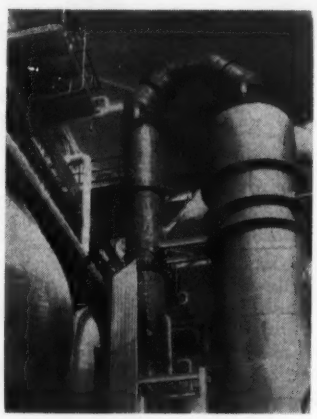
PETROCHEMICALS

Piping problems solved in hydrocarbon lines with expansion joint

Withstands temperatures to 1100°F

Control of high temperatures and pressures presented a challenge to design engineers at the Orange, Texas, plant of the Firestone Tire and Rubber Company. The plant produces 40,000 tons per year (10,000 lb/hr) of butadiene from butane via the Houdry catalytic dehydrogenation process.

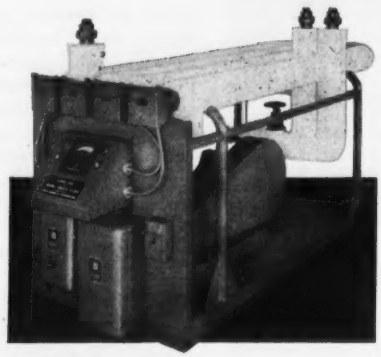
Among the problems faced was the size of joints in the pipe lines. Twenty-three of these joints measured 72″ in diameter. Some of the joints had to withstand temperatures as high as 1100°F. Also, it was necessary to compensate for complex movements.



Expansion joint design overcomes problems of high temperatures and complex movements in process piping system at butadiene plant

In many instances, the forces on the anchors and connected equipment were critical and it was necessary to use systems of hinged joints or tandem joints in order to minimize these forces. Other joints, because of complex pipe arrangements, had to take axial movement as well as lateral movement in two different directions. In the case of some pipe lines to the towers, the question of forces due to wind loading, weight of pipe, and other factors, posed a difficult design problem.

HI-TEMPERATURE LO-PRESSURE



liquid phase heat transfer systems

if
—Your product temperature requirements are high
—You want to avoid high pressure equipment
—You need close temperature control and safe, automatic operation at reasonable cost . . .

. . . . You should consider a space saving, all electric, Merrill Process System

Write for Bulletin 597 giving details of the Pilot Plant Series or send us your requirements.

MERRILL PROCESS SYSTEMS

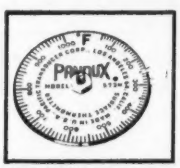
Parks-Cramer Company
FITCHBURG 12, MASS.

Check 1068 opposite last page

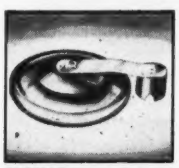
PANDUX® THERMOMETERS

Write for FREE temperature conversion chart...C to F and F to C O°K. to 5612°F.

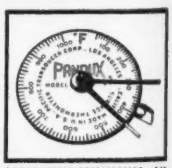
CHECK *any* SURFACE TEMPERATURE!



SPOT-CHECK Ⓣ All Stainless Steel. Four ranges to 1000°F. With magnet $4.00



SURFACE Three Ranges, minus 50°F. to 370°F. Also in Centigrade. With magnet $6.75



MAXIMUM-MINIMUM All Stainless Steel. Four ranges to 1000°F. With magnet $6.75

HI-HEAT Two Built-In Magnets. 50°F. to 750°F. $6.75

MAXIMUM - MINIMUM RECORDING With replaceable Chart. Minus 50°F. to 250°F. $19.50

PIPE For Pipe up to 2″ NPT. Minus 50°F. to 250°F. or 70°F. to 370°F. With spring clip . . $6.75

OTHER PANDUX THERMOMETERS: Stainless Steel Stem Dial Type regular and with maximum-minimum hands; Glass Mercury Immersion Types for production and laboratory.

Order through your dealer or write factory for Catalog CP-98
Phone GRanite 8-1134

PACIFIC TRANSDUCER CORP. 11836 W. Pico Blvd. Los Angeles 64, Calif.

Check 1069 opposite last page

The process called for hydrocarbon lines with a pressure range from vacuum to 2 lb absolute, and temperatures from 1000 to 1100°F. Air lines operate at 12-lb pressure and the same temperature ranges. Hydrocarbon lines vary in diameter from 30 to 48". Air lines are 54 and 72".

For the installation, low pressure joints incorporating a radically different curvilinear corrugation design, resulting in more uniform movement per corrugation, were used. The design of these joints is based on a careful correlation between shape, height, and pitch of the corrugations.

The natural, all-curve shape of the corrugation results in lower flexing stresses and increased flexibility, even without reinforcing rings. Longer cyclic life is assured because of these features. The weight is about half that of conventional joints, a factor in good performance obtained.

Because of the severity of temperatures, the bellows of all the joints were fabricated from stainless steel. However, welding ends are of stainless only on the high temperature hydrocarbon lines. On the air lines, where temperatures are lower, carbon steel welding nipples are used.

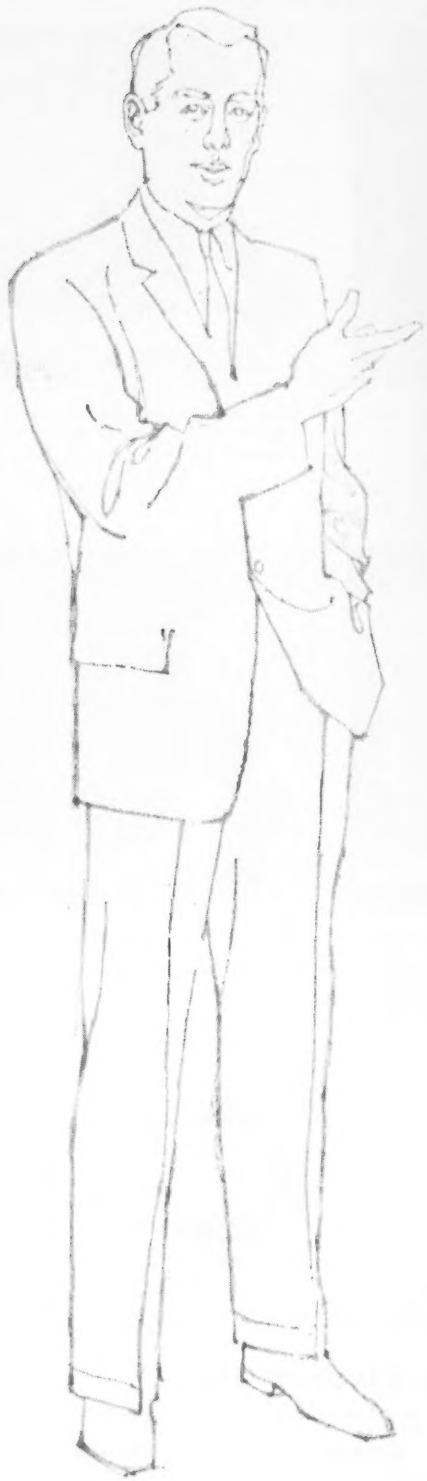
(Service-rated (S-R) expansion joints are product of Badger Manufacturing Company, 230 Bent St., Cambridge 44, Mass.)

Check 1070 opposite last page.

Compressors, turbines

Catalog of 40 pages features complete line of compressors and gas turbines, highlighting latest engineering and performance data with reference to chemical, petrochemical, petroleum, refining, and other industrial applications. Detailed specifications and diagrams, unit characteristics, and application suggestions are provided in well-illustrated Bul 151 — Clark Bros. Company, one of the Dresser Industries, 701 Lincoln Ave., Olean, N.Y.

Check 1071 opposite last page.



"I cut piping costs with

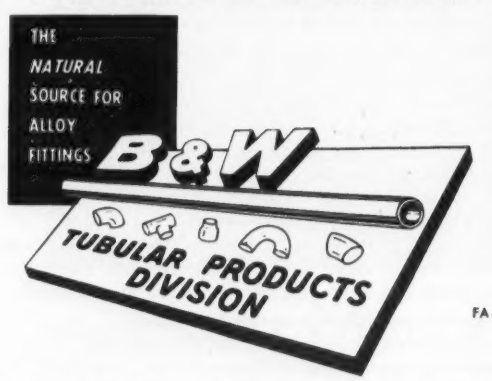
B&W Welding Fittings!"

"Minimum installation time and costs are my responsibility. The dimensional accuracy of B&W Welding Fittings permits quick and positive welding with no erection delays."

Cutting costs is everyone's responsibility. In a piping system, using welding fittings that align accurately is one sure way of saving time and money — in installation and in maintenance. The dimensional accuracy of welding fittings like this B&W Ell assures you of trouble-free fabrication and installation. Their true circularity, full radius, and walls of uniform thickness will enable you to make your piping dollars go farther. Write for bulletin FB504.

B&W Welding Fittings and Forged Steel Flanges are available in carbon steel and the B&W CROLOYS.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION • FITTINGS DEPARTMENT
3839 WEST BURNHAM STREET • MILWAUKEE 46, WISCONSIN



FA-8904-FE2

Seamless welding fittings and forged steel flanges, seamless and welded tubular products, solid extrusions — in carbon, alloy, stainless steels and special metals.

Check 1072 opposite last page

No matter which FINISH you like—you can buy it in

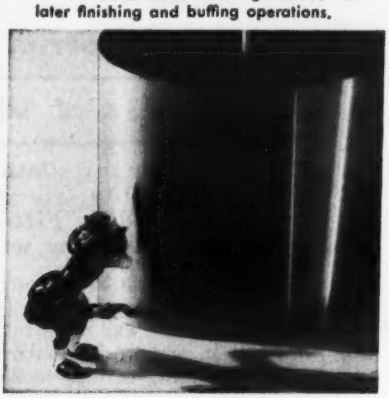
MicroRold® QUALITY STAINLESS STEEL

2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

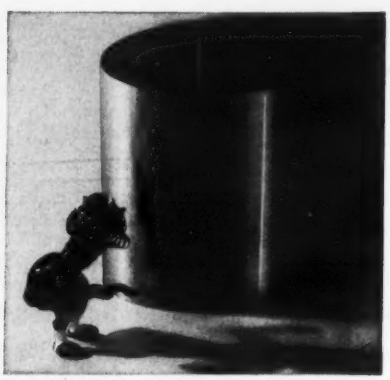
2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.

No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.



No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.



BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

Send today for your free copy of our new 28-page booklet, "MicroRold Special Purpose Stainless Steels"

Washington Steel Corporation

Producers of Stainless Sheet and Strip Exclusively

9-U WOODLAND AVENUE, WASHINGTON, PA.

Check 1073 opposite last page

Centerlining of flanges cuts costs for user

A recently added feature on manufacturer's line of welding-neck and slip-on flanges — centerlining of each unit — will save users thousands of dollars. Use of a patented machine for placing the centerline on the flange enables this to be done quickly, with no additional cost to the customer. Centerline is placed on the welding neck and on the OD of the flange, centered between the bolt holes.

Patented machine permits centerline to be quickly and easily placed on flange at no additional cost to customer

It is important to have a centerline on a flange to assure that it is welded on a pipeline with the bolt holes in the correct position. Otherwise, it might not be possible to install a valve in a pipeline at the correct angle.

For a man to lay out a centerline on a flange by hand takes 15 to 20 minutes. Hence, this can be a very costly item when thousands of flanges are used. For example, one small fabricator estimated that he spent $10,000 per year in labor putting centerlines on flanges. It is evident that use of flanges with a centerline on them can save users a great deal of money.

(Centerlined flanges are product of OTM Corp., PO Box 19296, Houston 24, Texas.)

Check 1074 opposite last page.

Butyl rubber's dynamic properties and applications are explained in detail in text and diagrams of eight-page loose leaf Butyl Bul — Enjay Company, Inc., 15 West 51st St., New York 19, N.Y.

Check 1075 opposite last page.

Taxing Research Labs

From page 27

programs is to a large extent dependent upon industry's wishes. Strict confidence about the work of sponsors is carefully preserved, patents are developed, and all information remains the property of the "sponsor."

Patentable discoveries and inventions resulting from sponsored university research are handled in a variety of different ways. Certain institutions are unwilling and a few refuse to undertake research projects likely to entail patentable developments. However, others enter into contracts under which the sponsor receives, for a consideration, ownership of all patentable discoveries, as well as full and confidential reports on the research findings. In many instances, publication is timed with the release of the product commercially.

Toll on Teaching

Another disheartening factor is the effect of this emphasis on applied research on a university's teaching standards. Pressure for business research has tended to overshadow the primary function of the teaching process. We can ill afford to weaken our standards of effective teaching to make way for additional business research within university halls. This practice greatly reduces the ability to conduct the much needed basic research. Another publication of the National Research Council in 1956 was entitled, "Non-Profit Research and Patent Management of the United States". This report states: "Universities should not be expected to serve as industrial research laboratories or commercial testing agencies".

In defense of their position, at least one institute has tried to justify its tax-favored business position by stating that all its applied research should be tax-exempt since it eventually benefits the public. It would be equally ridiculous to state that all income for professional services such as engineering, architectural, medical, or advertising supplied to industries should be tax-

Buflovak Nauta Mixer blends faster . . . takes less power . . . improves production

A new motion in mixing sets a new standard for blending dry materials of all kinds. Precessional motion, exclusive in Buflovak's Nauta Mixer, gives gentle positive action for uniform dispersion without dusting. A revolving screw flight travels around the interior of a stationary cone body . . . lifts the material to the top as it swings around the inside surface.

The results: intimate mixing even when handling materials of different fineness, different specific gravities. And Buflovak's unique design assures uniform mixing when using additives, wetting materials or dissolving solids in liquid media.

Available in models ranging in capacity from 10 to 125 cubic feet, Nauta Mixers do a more thorough job on a shorter mixing cycle to boost production and cut costs.

Send for Catalog 382 today. Additional facts are also available in the Chemical Engineering Catalog, pages 429-452.

Pre-test your mixing operation in Buflovak's Customer Service Laboratory

If your processing problem involves mixing, drying, evaporation, extraction, impregnation, crystallization or other related processes you can find the answers at the Buflovak Laboratory.

Equipped with an extensive line of small-scale and pilot-size units and staffed with experienced engineers, this research center has solved over 7000 processing problems. Whether you test a few beakers of material or make a full scale production run, you get positive results. Write for Bulletin 381.

BLAW-KNOX

BLAW-KNOX COMPANY

Buflovak Equipment Division
1645 Fillmore Avenue, Buffalo 11, New York

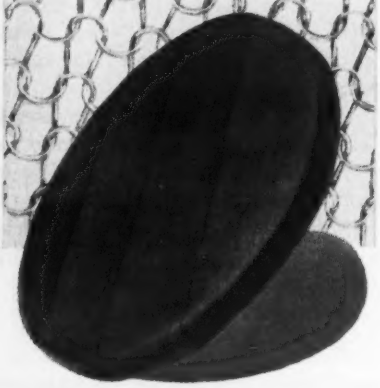
Check 1076 opposite last page

METEX

MIST ELIMINATORS

(ENTRAINMENT SEPARATORS)

Eliminate product loss, cut operating and maintenance ...at low first cost



Metex Mist Eliminators have been used successfully on many applications to knock back liquid entertainment. They are used in any vessel handling liquids and vapors when complete separation of the two phases is desired. Separation efficiency of 99%+ is maintained.

Ask Metex for engineering recommendations. Write today for Bulletin ME-6 and a data sheet.

METEX

METAL TEXTILE CORP.

9-175 ROSELLE, NEW JERSEY

Check 1077 opposite last page

Taxing Research Labs

From preceding page

exempt because they might conceivably result in eventual direct or indirect benefits to the public.

Recommendations

It would not be reasonable to make a presentation of this type without some recommendations. I suggest:

1) Non-profit research institutes, university research laboratories, and all others operating as tax-exempt or tax-favored, should publish *all* research results *immediately*. (The national security needs must be maintained and publication of scientific findings which would not fully conform to these security standards is not advocated.)
2) Institutes or laboratories which accept and carry out applied business research projects should be removed from tax-exempt or tax-favored status.
3) Ways and means should be developed to interest industries in underwriting *basic* research in non-profit institutes and universities.
4) All organizations requesting tax favoritism or tax exemption should have their applications made public record, and make annual reports, including tax reports. This would aid materially in the policing problem which the Treasury Department and Bureau of Internal Revenue now has.

There is nothing wrong with applied or business research. It is a commendable thing . . . a business operation. Because of applied research, we have developed the high standard of living which we all enjoy. It develops competitively, and if conducted for a profit or with a profit motive, should be taxed.

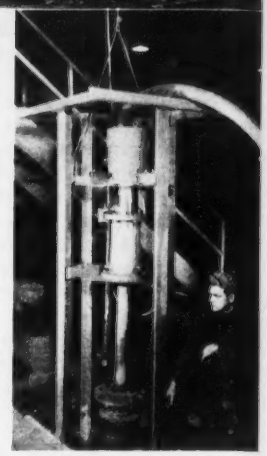
If as an investigator I should start out to determine the activity of fifty chemical compounds against a given bacteria or germ merely to in-

At The New Jersey Zinc Co., Jefferson City, Tenn.

NAGLE VERTICAL SHAFT PUMP

IS RIGGED FOR EASY INSPECTION

A Nagle 2" type "CWO-C" sump pump with abrasion resistant water end is doing a good job at New Jersey Zinc Co.'s Jefferson City, Tenn. Mill. Its function is to return flotation spills and filter vacuum pump water to the flotation circuit. Pump is mounted within a frame with guides for easy raising and lowering. Pump is shown raised. In service a year, no maintenance has been required. This is not unusual for a Nagle Pump—built for abusive applications exclusively. Send for Nagle Pump Selector.



NAGLE PUMPS

NAGLE PUMPS, INC.

1247 CENTER AVENUE, CHICAGO HEIGHTS, ILLINOIS

PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

Check 1078 opposite last page

The *Work-Horse* of Mechanical Seals

For the long haul on heavy-duty sealing jobs —specify the engineered mechanical seal with the greatest record of service on processing equipment . . .

DURA SEAL

THE ENGINEERED MECHANICAL SEAL

FOR FURTHER INFORMATION WRITE FOR CATALOG NO. 480-CP

The PERFECT SEAL

DURAMETALLIC CORPORATION

KALAMAZOO MICHIGAN

Check 1079 opposite last page

crease the well of knowledge — with the idea that it would be published immediately for the good of all who could use the knowledge — that is pure or basic research. It is the kind of research that our non-profit institutes and universities were initially set up to conduct. It should be tax-free, and no one will argue with that.

Contract Maintenance

From page 30

tractor's, the contractor's cost is lower when consideration is given to a normal schedule of fringe benefits enjoyed by most industrial workers.

While the actual hourly rates for maintenance contractor in accordance with construction trades practices are higher, the total manhour costs for contract labor are lowered because of the fringe benefits which must be provided for every man on the owner's payroll.

The contractor will require only the minimum necessary facilities for the use of his forces and will have no employee benefits except those required by law and by the terms of construction contracts. Also you must not forget the savings afforded by the flexible force.

Q — Have you had any problems integrating men from the building trades unions with plant unions?

A — No. The AFL building and construction trades support and advocate contract maintenance. We have entered into agreements with all of the members of the Building and Construction Trades Council.

These contracts were signed shortly after the formation of Catalytic Construction Company in 1946, following personal negotiations between T. Ellwood Webster, president of Catalytic, and the presidents of the various unions.

A labor policy for Catalytic, based on a fair and friendly

faster, SAVES YOU SPACE AND MONEY!

This is a true case history of all the companies who use Vulcan steel shipping containers. Their composite story reads like this: delivery of pails forced them to tie-up excessive funds and space in a big inventory. They switched to Vulcan, and got faster delivery, in all quantities, on a precise and rigidly maintained schedule. Their inventory needs dwindled rapidly, and they had more free cash and manufacturing space. The same thing can happen to you, because Vulcan is an expert authority engaged exclusively ih the manufacture of steel pails and drums, and maintains the largest warehouse stock of these items. This means we can deliver your needs and inventory savings at the same time. May we prove it to you?

NOW! REDUCE STEEL CONTAINER INVENTORY COSTS! MAIL THE COUPON TODAY FOR TEST SAMPLES AND THE NAME OF YOUR VULCAN REPRESENTATIVE!

Hi-Bake protective linings · one to 55 gallon capacities all variations of open or closed heads faster delivery from the largest warehouse stock · from a carton to a carload · brand name decoration · special designs

VULCAN CONTAINERS INC. Bellwood, Illinois

VULCAN CONTAINERS INC., Bellwood, Illinois

Gentlemen: I am interested in: CP-98

☐ Pails, in the following sizes, ...

☐ Hi-Bake protective linings for (product) .....

☐ 55 gallon drums.

Please get this information to—

Name .....

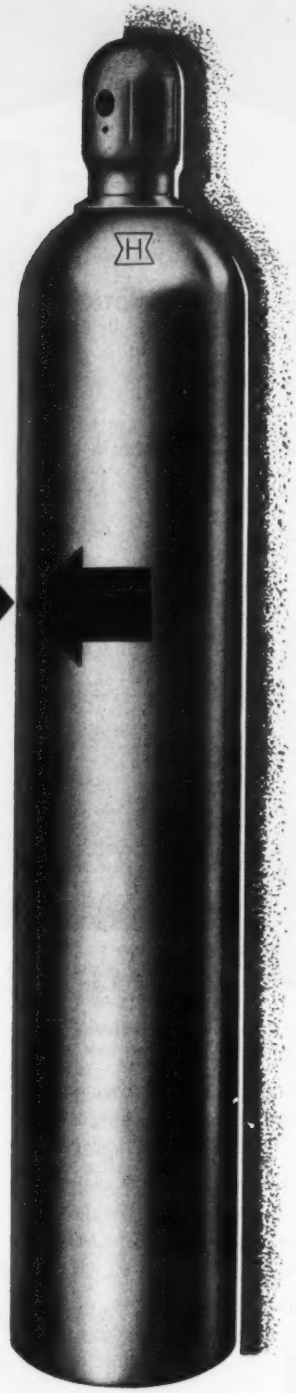
Company .....

Address .....

City ..... Zone ... State .....

Check 1080 opposite last page

HOW THICK SHOULD A CYLINDER BE



One of the most vital requirements in High Pressure Gas Cylinders is the assurance of adequate metal thickness to insure safety, as well as prolonged service life. To determine this, the XactRAY wall thickness gauge was developed by Harrisburg Steel Co. Exceeding the requirements for impartial testing of each cylinder as specified by the Interstate Commerce Commission, Harrisburg Steel Co. also employs such special quality control devices as the Sonigage and Vidigage. With the help of this equipment and by constant rigid inspection, cylinder users are assured of the safest and longest lasting containers whether made from manganese steel or chrome molybdenum alloy steel.

More than a Century in Harrisburg 24, Pa.

H HARRISBURG STEEL CO.

Division of HARSCO CORPORATION

TUBES TRANSPORTS FLANGES COUPLINGS

Check 1081 opposite last page

Contract Maintenance

From preceding page

relationship with all union personnel and a strict observance of the letter and spirit of our labor contracts, was established.

To carry out this policy we have established the unusual custom of arranging a pre-job conference near the plant site with local and international representatives of the building trades.

At these conferences, our labor policies are explained, the work to be performed is illustrated, and the expected manpower requirements are announced. After the scope of work is outlined, procedures for establishing local practice in the matter of jurisdictional disputes is established.

When the project is under way, the construction superintendent continues the close personal relationships with the union's personnel through weekly meetings with craft foremen and stewards. These meetings are conducted for the dual purpose of promoting job efficiency and harmony. The projected work for the coming week is discussed with union personnel, and their questions or suggestions are encouraged.

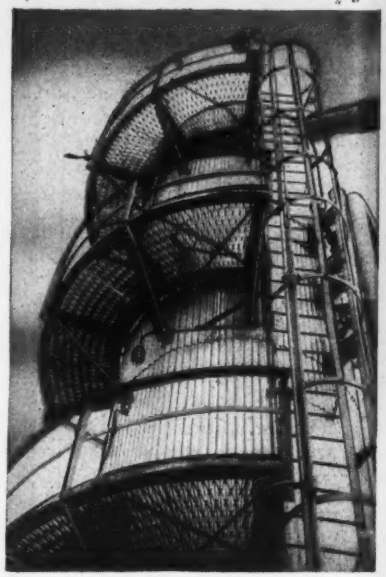
It is practice that all union grievances are brought to the meeting, and it is an established Catalytic policy that the causes of the grievances will be eliminated before the following meeting. This straightforward handling of job problems has resulted in excellent labor relations on all Catalytic projects throughout the country.

Catalytic Construction Company in its entire history has never suffered a complete job shutdown as a result of labor dispute. And we have experienced no difficulty in planning work so that our AFL mechanics work side by side with plant maintenance personnel.

Q — What about supervision integration?

A — Just as our labor supply is flexible, so are our management services flexible to work harmoniously with owner's staff. To illustrate how our supervisors work with

RAIN OR SNOW CAN MAKE CATWALKS DANGEROUS



Walkways, catwalks and treads made of solid wood, metal or other material can collect snow, rainfall, grease or oil and become dangerously slippery.

But these walking surfaces, made of an open mesh of metal bars on edge, cannot collect these substances, leaving the surface always *clean*, dry and tractional for safer access to high places.

As founders of the grating industry, the Irving Company can draw upon over half a century of experience to supply you with quality grating products for catwalks, treads and other practical and economical uses.

"A FITTING GRATING FOR EVERY PURPOSE"

Write for our General Grating Catalog.

IRVICO

IRVING SUBWAY GRATING CO., Inc.

Originators of the Grating Industry

Offices and Plants at
5050 27th St., LONG ISLAND CITY 1, N. Y.
1850 10th St., OAKLAND 23, CALIFORNIA

Check 1082 opposite last page

plant personnel and coordinate the maintenance operation, let's again look at the set-up at the Tidewater Refinery.

The refinery has a small management force to direct the maintenance operation. This consists of a manager and an area coordinator for each of the three areas into which the plant has been divided. In support of these area coordinators are an instrument engineer, and an electrical engineer. The refinery also has a small metal-inspection group.

We, as the maintenance contractor, are staffed and fully responsible for planning, estimating, scheduling, and supervision of field work.

To perform this service, Catalytic has a project manager, a general field supervisor, and three area superintendents. This group is supported by the planning and coordination group and by a staff of craft supervisors. Catalytic operates the machine, pipe, boiler, automotive, sheet metal, and steel fabrication shops for the owner.

Work requests originate at the operating level and are processed by the Tidewater staff to determine whether the work is necessary for the efficient operation of the plant.

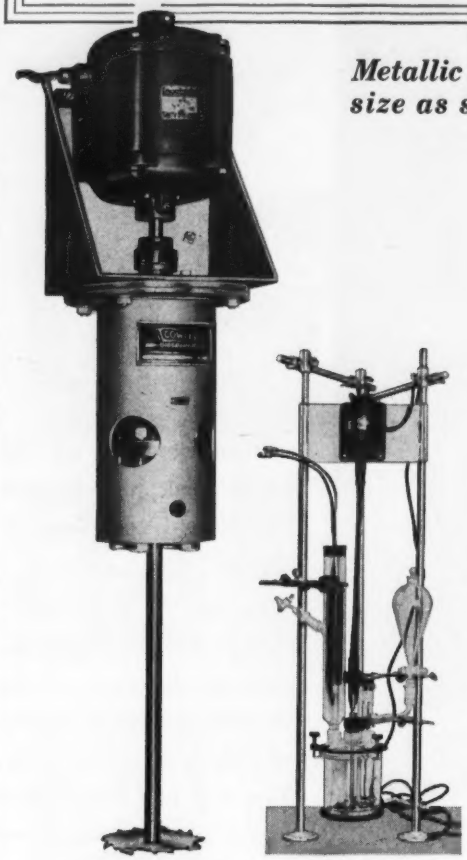
On major work requests, Catalytic may be asked to estimate the cost and establish a tentative schedule. These costs and schedules are again reviewed by the Tidewater staff to determine if they are warranted and reasonable in view of the requirement.

If the project is authorized, a work order is issued, and Catalytic is responsible for the entire function until the work is completed. During this part of the operation the Tidewater staff serves as inspector of the quality of the performance, and at completion will check final cost against the estimate.

Q — How do all these benefits cited for the refineries hold true for the other process industries?

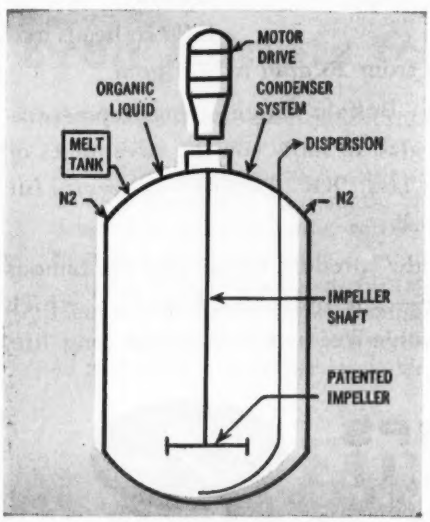
A — In varying degrees, the

FOR EXOTIC FUELS...



Cowles Pilot-Plant Sodium Dispersion Dissolver

Cowles Laboratory Sodium Dispersion Dissolver



Schematic Plant Diagram

Metallic dispersions finished in 30 minutes or less, particle size as small as two microns, with Cowles Dissolvers.

Largest Manufacturers have selected Cowles equipment

Highest quality metallic dispersions can now be easily controlled and produced in big volume, making many reactions commercially practical for the first time.

Key to the new method is the unique action of the patented Cowles impeller. With rim speeds of up to 6150 fpm, the impeller vanes create a zone of intense turbulence and hydraulic shear. The liquid is moved rapidly through itself until maximum dispersion is obtained. The Cowles thus gives several many very important advantages:

Versatility — prepares material for many reactions under conditions not heretofore possible.

Finer particle size — gives maximum reaction surface to dispersed elements.

More complete dispersion — assures complete homogeneity of material.

Greater speed — cuts finished dispersion time substantially.

Cleanliness — self-cleaning impeller will not clog with metal.

Safety — gives the close control necessary with highly active materials.

Predictable results — laboratory and pilot-plant models provide results easily duplicated in larger models.

New Cowles Dissolvers with properly sealed and specially designed drives for metallic dispersions are available for all purposes. Included are "package" models in both laboratory and pilot plant types, and models for commercial production. All are thoroughly proven in actual plant operations and represent the broad experience and know-how of our organization – the established leader in its field. Specialized engineering assistance can be supplied if desired.

For complete information write today for Technical Bulletin No. 21-1957, "Metallic Dispersions with the Cowles Dissolver."

Additional Cowles Dissolver models are available for efficient processing of all solid-liquid, liquid-liquid and gas-liquid products.

Take advantage of the unusual *Morehouse-Cowles Processing Equipment Application Service* at no obligation – for a comprehensive survey of your plant requirements and end products, with laboratory assistance and in-plant tests at our risk.

5702-R

For complete information write, wire or phone –

MOREHOUSE® COWLES®

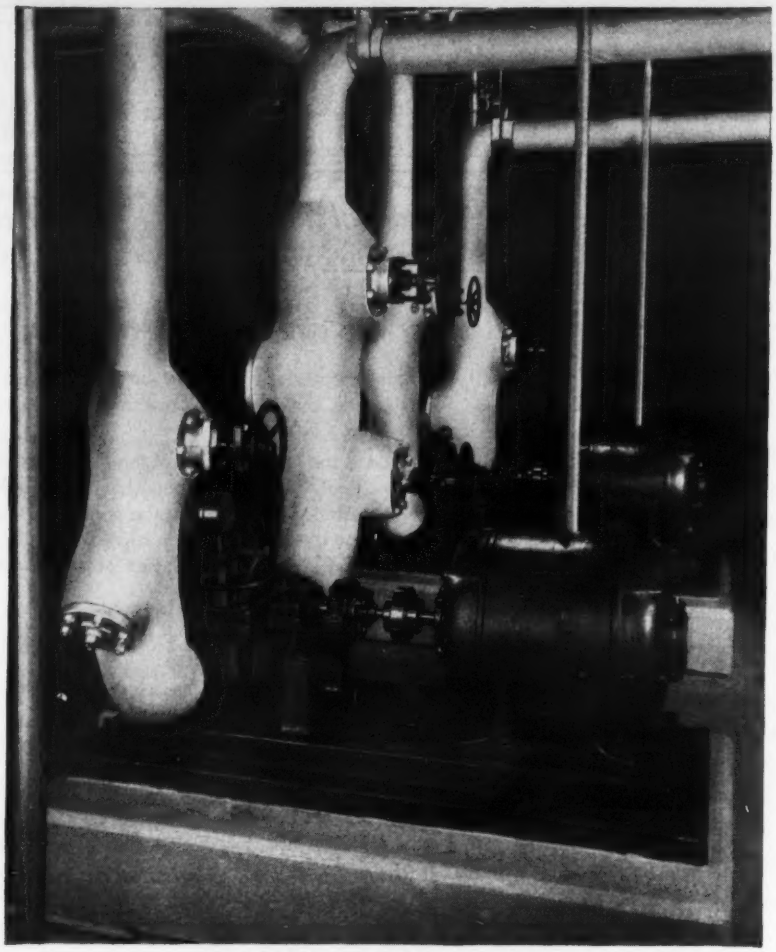
MOREHOUSE-COWLES, INC.

1150 San Fernando Rd.
Los Angeles 65, Calif.
Telephone CApital 5-1571

Henry Grady Bldg.
Atlanta, Ga.
Telephone LD 554

Convenient lease and time-payment plans • Distributors in principal cities

Check 1083 opposite last page



"Buffalo" Class "RR" Two-Stage Pumps

THEY PUMP MORE WATER AT LOWER COST

TESTIMONIALS from satisfied users prove the outstanding performance record of "Buffalo" Class "RR" Single Suction Multi-stage Pumps. These sturdy pumps are specially designed for high pressure and temperature clear water conditions.

The constant hydraulic balance of the "RR" design is the key to the high efficiencies these pumps deliver on the job. Rugged construction, generous bearings, extra-deep stuffing boxes — all add up to peak performance and long-lived dependability.

"Buffalo" Class "RR" Pumps are available in two and four-stage models, and in a variety of sizes to suit your needs. You will find them a best buy for any clear water service — hot or cold, at pressures up to 1500 ft. heads and at capacities from 20 gpm to 900 gpm.

Your nearby "Buffalo" Engineering Representative will be glad to show you the advantages of "Buffalo" Class "RR" Pumps — or write for Bulletin 980-E.

Every "Buffalo" product brings you the famous "Q" Factor — the built-in QUALITY which provides trouble-free satisfaction and long life.

BUFFALO PUMPS
DIVISION OF BUFFALO FORGE CO.
524 Broadway • Buffalo, N. Y.
Canada Pumps, Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

"Buffalo" PUMPS

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

Check 1084 opposite last page

Contract Maintenance

From preceding page

benefits cited for contract maintenance operations in refineries can be established for other process industries. The most obvious benefit of this operation in the refineries is the flexible force to meet the widely fluctuating requirements resulting from shutdown of large processing units.

Very significant economies can be established for plant operations which do not have wide fluctuations in manpower requirements. These advantages lie in the greater freedom of action permitted the owner as a result of the labor relations agreement under which the building trades mechanics perform maintenance work. This agreement allows complete latitude in the selection of mechanics and supervisory staff.

Contingent liabilities under employee relations programs common to most industrial contracts are eliminated, since all of the owner's obligations are discharged through the payroll from week to week. In an industrial operation where the maintenance requirement justified a fixed force, Catalytic has cut maintenance personnel in half with contract maintenance service. This figure was compared to an identical plant operated with plant force under an industrial union contract.

Research Problems

From page 31

This lack of agreement on the definition of research is highly significant. So is the idea that small industry does have need of the short-term technical service of the type described. While some universities will give this service directly, most of them will not.

In our own case, and in many other institutions, such short-range jobs are normally referred to individual faculty members in a consulting capacity and would not appear in any of the research figures of the university.

Where only short-range technical activity is feasible for the small company, consulting services may be the answer. This is an extremely large activity, but, as far as I know, no one has ever made an accurate study of its scope and importance. From spot-checking, I am sure this service is extensively used by small industry.

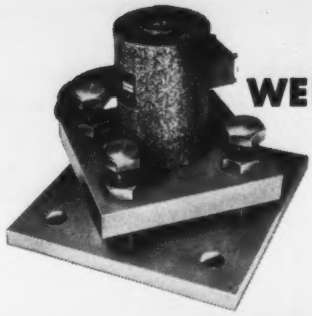
Here, again, the definition of research is significant. The question boils down to a problem of what the small businessman wants in his research. If he wants to do research largely for its sales and publicity value, he probably should go somewhere other than a university.

If he is interested in the scientific knowledge that comes from research, the university is a good place to get it, and it is not even necessary to support research there. The university is an association of scholars who, in addition to teaching, are expected to do research to develop new information and to keep posted on the newest developments.

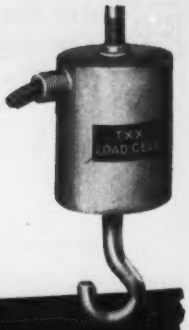
They have at their disposal excellent equipment with which to work. Most universities allow their faculty to act as consultants for outside groups up to one day per week.

There is no question that university people as consultants are already doing a great deal for small business. However, I suspect that this is a situation that could be improved upon to the substantial benefit of small business. The proper selection of a consultant could be greatly expedited if there were only a directory showing who was available and what he could do. In the meantime the businessman must dig this information out by himself.

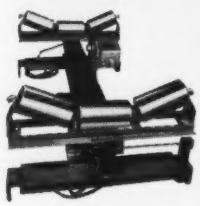
And, if through no other way, the faculty consultant can be a help to the small businessman through education. He can educate small business in what research is all about, in what it can or cannot do for him, and in how he can benefit from research. The small businessman should not be hesitant to seek him out.



WEIGHING... BATCHING...

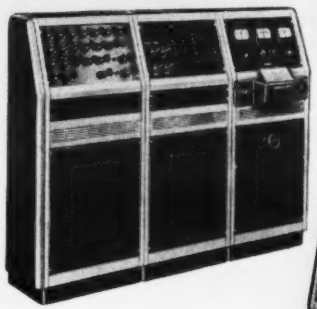


Fairbanks-Morse Scales Offer New Economy, Accuracy, Speed...Electronically!



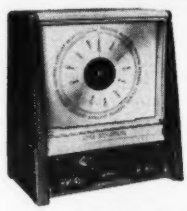
Belt conveyor scale and instrument

Read-out to auto-typewriter or tape

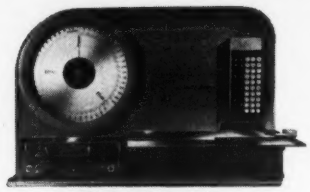


Punch card operated sequence batcher

Sequence batcher for manual programming



Desk instrument for weighing



Desk instrument for weighing and printing

Even Adapts to Present Mechanical Systems

Fairbanks-Morse electronic control and instrumentation permits remote location of weight recording instruments...assures automatic balance detection...automatic ranging without drop-weights...automatic zeroing...pushbutton recording and much more.

This same electronic control of weight measurement can be employed to streamline your batching operation. You can select precise quantities of all materials...in proper sequence...at the push of a button. Or you can put the batching formula on a punch card and do the whole job automatically.

Weight readings can be fed to automatic typewriters, adding machines, tape punchers, etc. Chances are your present lever system can be converted to electronic operation.

For more information write today for new literature. Fairbanks, Morse & Co., 600 S. Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE

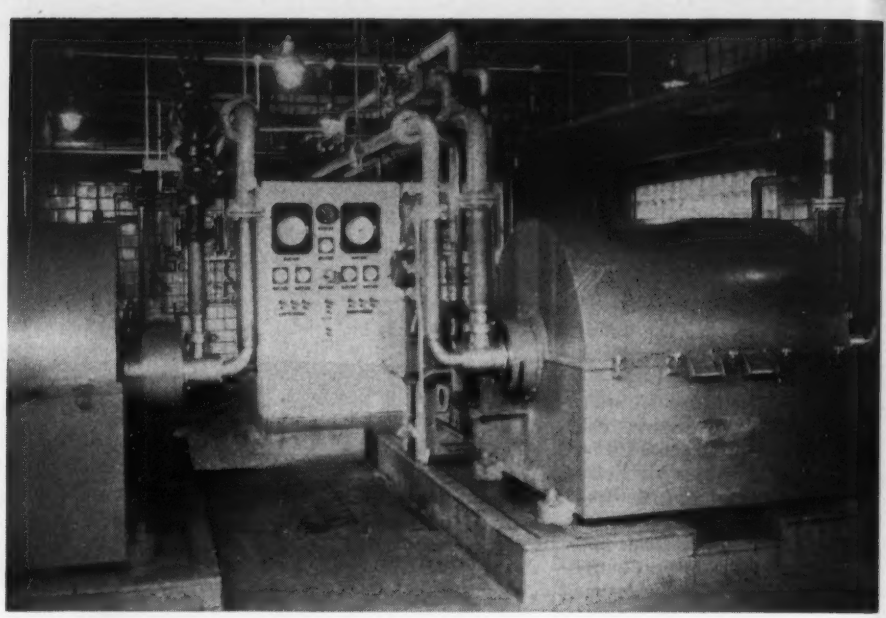
a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

Check 1085 opposite last page

Using efficient centrifugal extractors, compact, streamlined process cuts costs and greatly simplifies a traditionally difficult liquid-liquid extraction job. Commercially proven at Weirton Steel Company, process . . .

Removes Over 98% of Phenol from Coke Plant Ammonia Liquor



Key units are a continuous centrifugal extractor and reactor

PHENOL is being recovered easily, efficiently, and economically from coke oven waste ammonia liquor by a streamlined, compact, continuous process at Weirton Steel Company, Division of National Steel Corporation, Weirton, West Virginia. Process greatly simplifies an operation that has bottlenecked the coke oven by-product industry for years. Developed by Wilputte Coke Oven Division of Allied Chemical Corporation, the technique results in over 98% phenol removal from the ammonia liquor. About 150,000 gal of weak ammonia are processed daily at Weirton.

Operation consists essentially of liquid-liquid extraction. Key units are a continuous Podbielniak centrifugal extractor and reactor. These replace bulky decanters, contacting chambers, and packed towers used in conventional solvent extraction processes. Operating costs for the new system are lower and there is also some reduction in space requirement.

Reported to be the first large scale plant of its kind, the facility has been surrounded by a cloak of secrecy since its start up on December 31, 1956. Details were only released a short time ago after officials were convinced that the plant had commercially proven itself. Wilputte has subsequently announced that it is building a larger unit for Allied's Semet-Solvay Division. Plant will process 250,000 gal ammonia liquor per day. It is scheduled to go into operation this year.

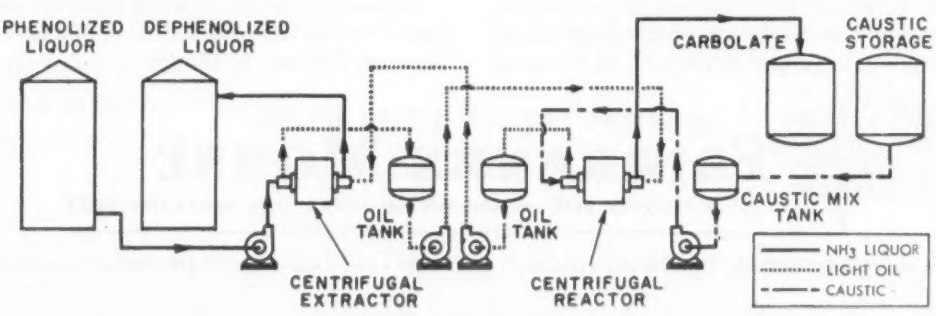
In the process, raw ammonia liquor containing about 3000 ppm phenol, is pumped into the centrifugal extractor. Previously freed of tar and other solid carbonaceous matter, liquor is cooled from 65°C to 40°C by shell-and-tube coolers before entering extractor. Flow rate into unit is approximately 110 gpm at 90 psi.

Inside extractor, the ammonia comes into contact with countercurrently flowing dephenolized light oil. Oil acts as solvent for the phenol, removing it from the ammonia liquor. Oil inlet pressure is 155 psi. Oil to liquor feed ratio is 1.25/1.0.

Extractor operates at 1750 rpm, developing centrifugal force of about 2000 times gravity. Action taking place in unit is one of continuous, countercurrent mixing and separation of two liquid phases in the elements of the spinning rotor. Retention time is approximately 45 seconds. Dephenolized ammonia liquor leaves extractor and is stored in tanks for subsequent distillation in coke plant.

Reactor Dephenolizes Oil

The phenolized light oil is next sent to an oil pump tank from which it is fed at 185 psi into a centrifugal reactor — a unit quite similar to the extractor. Reactor operates at 1500 rpm. Inside unit, oil flows countercurrently to a caustic solution. Oil to caustic feed ratio is kept at about 150/1. Caustic reacts with phenol, forming sodium carbolate, a saleable product. This separates out, leaves unit, and is sent to storage tank preparatory to shipping. Dephenolized



Streamlined process for extracting phenol from coke plant ammonia liquor eliminates need for large, bulky decanters, or packed towers

Process, Utility, and Labor Requirements

CAUSTIC — 1 lb/lb phenol

ELECTRIC POWER — 100 kw

STEAM — Used only for steam tracing and tank warming in cold months

WATER — Small quantity for process requirements. Approximately 40 gph for caustic solution (city water), ¼ gal mill water/gal weak liquor treated, for liquor cooling, yearly average

AIR — Instrument air only

LABOR — 1 man/shift

light oil flows to oil pump tank from which it is recycled back to centrifugal extractor, thereby completing cycle.

The processed ammonia liquor contains about 35 ppm phenol — a reduction of over 98% from original concentration of 3000 ppm. Caustic consumption is approximately 1 lb per lb of entering phenol. Solvent holdup for entire system is less than 1000 gal. This volume is said to be less than 2% of total solvent holdup (65,000 gal) required for a conventional static-type plant of comparable liquor handling capacity and efficiency.

Light oil loss is practically negligible. Principal points of losses are the very small amount from pump tank vents and any pump packing leakage. Solvent dissolved in dephenolized liquor is returned to gas stream following distillation in ammonia still.

(Further information about continuous phenol removal process can be obtained from Wilputte Coke Oven Division, Allied Chemical Corp., 40 Rector St., New York 6, N.Y.)

Check 1086 opposite last page.

(Chemizon centrifugal extractors are product of Podbielniak Inc., 341 East Ohio Street, Chicago 11, Ill.)

Check 1087 opposite last page.

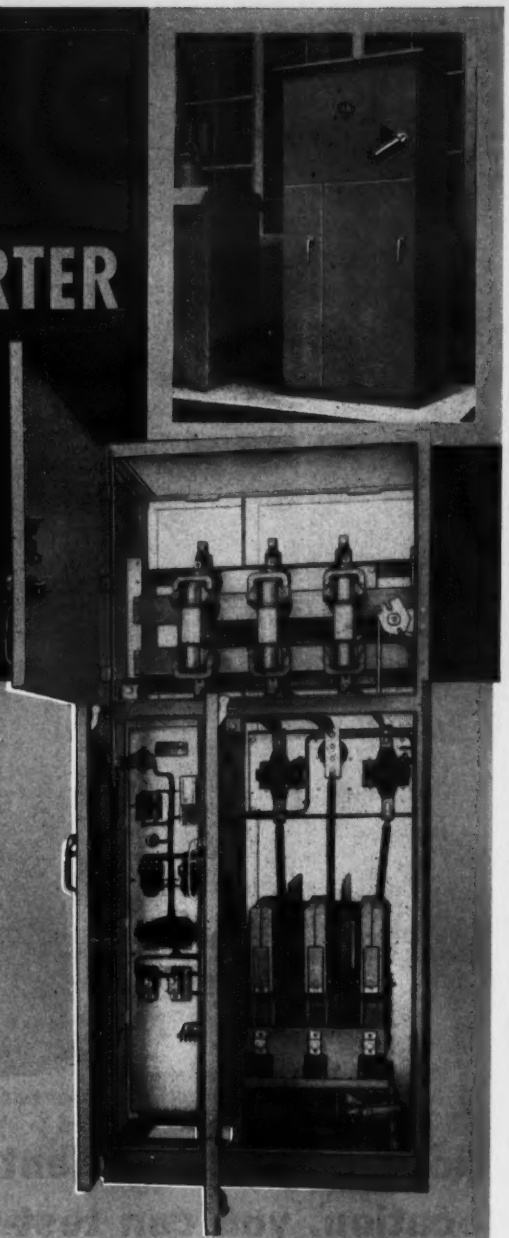
ALLEN-BRADLEY

2300-volt

AIR BREAK STARTER

operates 350 hp Pump Motor

. . . 750 ft DOWN!



Here at the new Croname, Inc., plant in Niles, Ill., every precaution has been taken to insure an unfailing supply of water for their plating processes . . . and thus an Allen-Bradley high voltage starter was chosen for the 2300-volt pump motor.

Water is pumped at 750 feet from the 1470-foot well into a reservoir where the level is automatically maintained by float switches.

Allen-Bradley high voltage starters have no trouble in frequent ON-OFF service. The simple solenoid type, air break switch—with only ONE moving part—assures a tremendous operating life. In addition, the double break, silver alloy contacts never need servicing . . . they remain in perfect operating condition until completely worn away.

These rugged and reliable air break contactors are the heart of a complete line of full voltage and reduced voltage starters—nonreversing and reversing—for squirrel cage, part winding, slip ring, and synchronous motors. Available in ratings up to 1500 hp, 2300 v; and 2500 hp, 4600 v, at 0.8 P.F.

Complete information is contained in Publication 6080 . . . be sure to send for your copy.

Bulletin 1139 full voltage starter. All A-B high voltage starters have current limiting fuses, front operated disconnect switches interlocked with cabinet door and contactor, and motor overload protection. At top, Bulletin 1139 in NEMA Type 3 weather resistant enclosure at Croname, Inc., plant, controlling a 350-hp Byron Jackson submersible pump.

ALLEN-BRADLEY

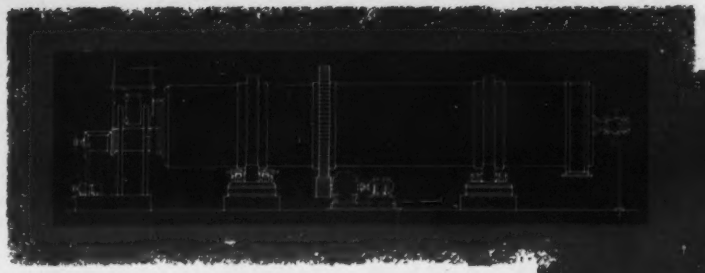
QUALITY

MOTOR CONTROL

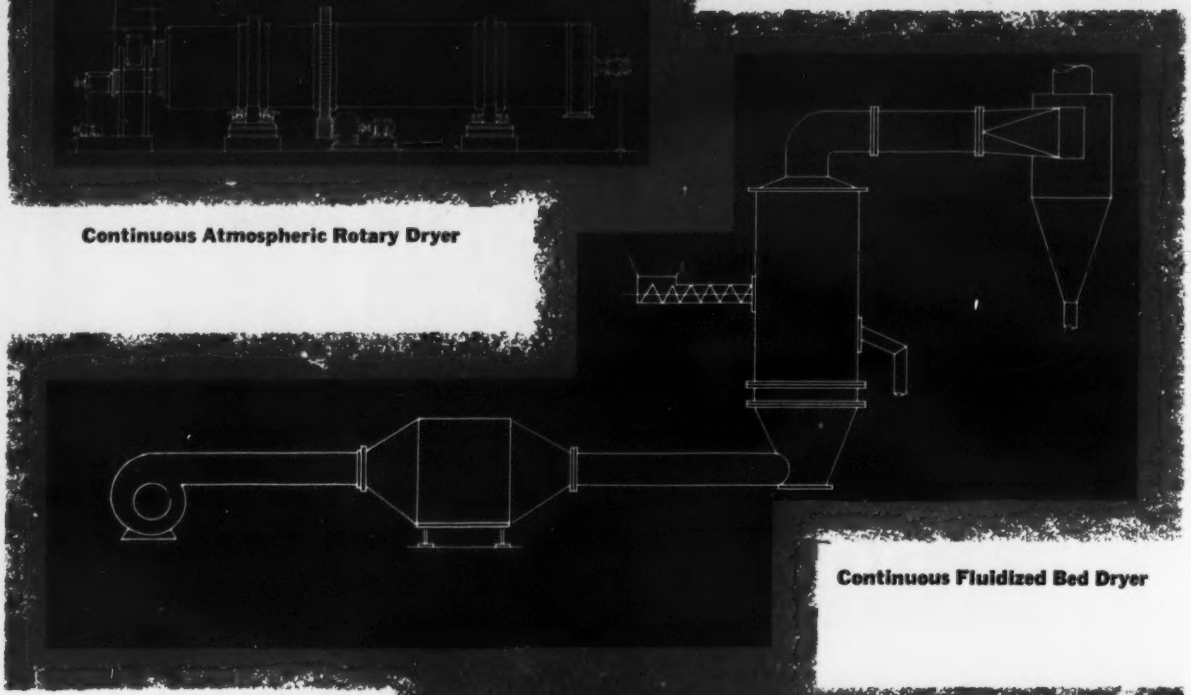
A-B QUALITY

Allen-Bradley Co., 104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

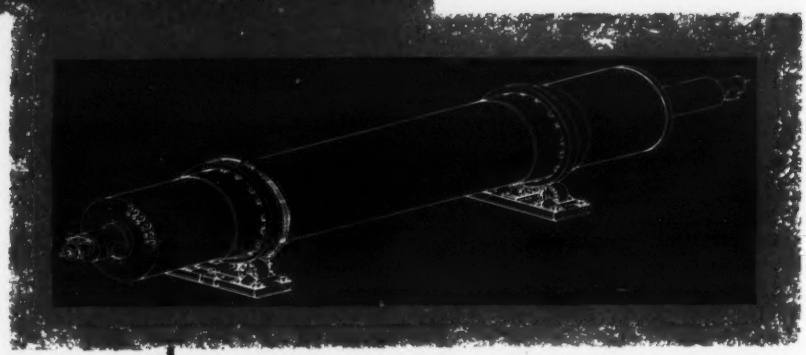
Check 1088 opposite last page



Continuous Atmospheric Rotary Dryer



Continuous Fluidized Bed Dryer



Continuous Solvent Stripper
Continuous Gas Solids Reactor
Continuous Vacuum Dryer

Now, at one convenient location, you can test-dry your materials in a variety of equipment

At General American's East Chicago pilot plant, you can test the drying or reacting of your materials in the widest range of drying equipment ever assembled in one place.

Louisville Dryer engineers will work with you—study your materials and needs, make recommendations for type of equipment, size and heating medium. You can check these recommendations for yourself through practical tests. Your Louisville Dryer is then engineered for most efficient and economical service—built specifically to meet your needs.

To test the drying of your materials in all these different types of drying equipment, call in a Louisville Dryer engineer. There is no cost or obligation.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYER DIVISION
GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street, Chicago 90, Illinois
Offices in principal cities

Check 1089 opposite last page

Oxidation of surfaces on metal-clad walls checked by coating

Resists sun exposure effects; preserves original finish

Problem: Metal-clad walls of the American Sterilizer Company plant, Erie, Pa., exhibited the effects of weathering, three years after plant's completion. Some parts of wall surface were extremely dirty and slightly pitted with corrosion.

The company wanted to restore the metal walls as nearly as possible to their original appearance. The most important goal was to be able to preserve the restored finish against a recurrence of dulling, corrosion, and pitting, all of which had accelerated the accumulation of air-borne grime.

Solution: After conducting tests on a protective coating for a nine month period, it was decided to clean and coat the building with a butyrate lacquer formulation, supplied by Pyroxylin Products, Inc., Chicago.

Treatment of the metal walls prior to coating required that all oxides and soil be removed in order to present a completely greaseless, clean surface for the lacquer. This was accomplished by first brushing a water solution of a chemical cleaner and brightener directly onto the surface of the metal. In addition to removing dirt and grease from the surface, the brightener dissolved the grayish-white oxide film and, to a limited degree, attacked the metal itself.

In order that the action of the chemical brightener be uniform and not result in a streaked appearance, the solution was brushed constantly during its contact with the metal. After three to four minutes the brightener was

To page 74

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

THAT'S INTERESTING

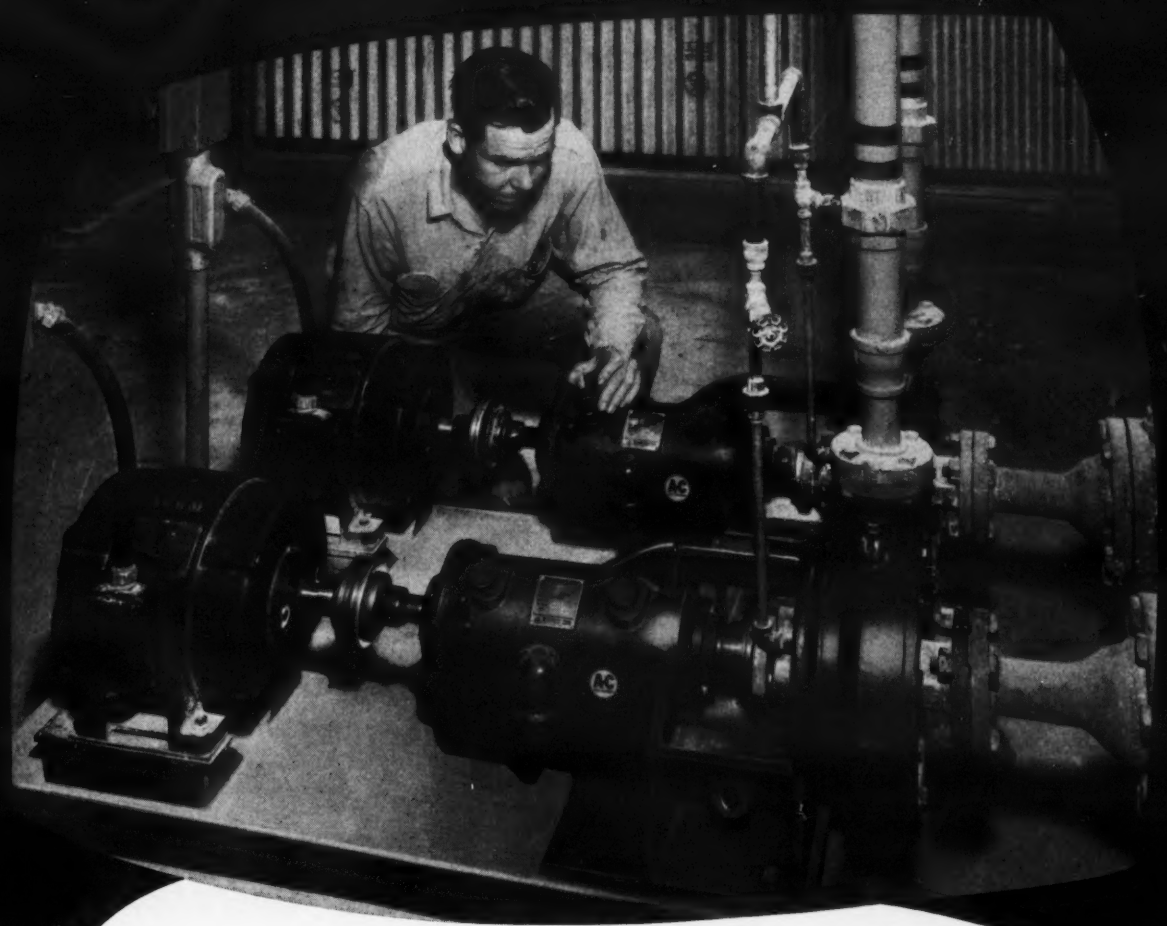
Beach house bonanza?

An aluminum beach house of tomorrow may be lived in today. The unique metal-and-glass structure, featuring a star-shaped floor plan, was introduced by ALCOA last year. It has aroused such interest that ALCOA has arranged for its fabrication and erection anywhere in the United States. The 700-sq-ft structure is currently being quoted in the $25,000-and-up range.

Beep pickup by portable

Satellite beeps can be picked up on ultra-sensitive receiver of sub-miniature design developed by Motorola. Purpose of unit is to acquire satellite data points other than the relatively few fixed stations set up for tracking. Receiver looks like "Handie-Talkie" radiophone. Total weight is 10 lb. (*Newsgram*, Motorola Inc.)

For more information on product at right, specify 1090 see information request blank opposite last page.



Built to handle YOUR hot pumping job

Here's a *right* line of pumps from Allis-Chalmers for high temperature applications. These oil-lubricated models are of simplified design for easy maintenance — yet offer every feature needed for low-cost handling of hot and corrosive liquids.

Look at these features:

- A wide range of ratings up to 3500-gpm capacity, with heads to 550 feet.
- Impeller material as required — bronze, iron, stainless steel, high nickel alloys and other alloys.
- Get reliable double-row ball bearings guarded by constant level oiler which permits continuous lubricant surveillance.
- Sealing arrangement available from a variety of packings and mechanical seals.

Pump, motor and control are available as a unit from Allis-Chalmers. See your A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

A-C ALLIS-CHALMERS

A-5778

A
FLUSH BOTTOM VALVE
that
WILL NOT CLOG UP!

Designed for Chemical and Pharmaceutical Industries

Strahman

RAM TYPE

Drain Valves

The Strahman Drain Valve is the only valve that cannot clog up. It is so designed that in the closed position the piston or ram extends up into the tank thus preventing any possibility of the outlet becoming plugged.

In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.

Write direct for complete catalogue

SV STRAHMAN VALVES, INC.
14 HUDSON STREET
NEW YORK 13, U.S.A.

Check 1091 opposite last page

NEW SOLUTIONS

From page 72

washed from the surface with a hose to remove all dirt and chemical residue.

Passivating Treatment

Following cleaning and brightening, the surface of the metal received a further treatment with a passivating agent. Tests have shown this treatment provides maximum adhesion and life to the butyrate lacquer coating. The passivating agent was hosed off the metal after two to three minutes contact.

Inasmuch as the passivating pretreatment prevents the rapid recurrence of oxidation, no haste in applying the lacquer was necessary and several 100-foot sections of the building were cleaned, brightened, pre-treated, and permitted to dry before the lacquer was applied.

Thinned approximately 1½ times its own volume, a single coat of the lacquer was sprayed onto the aluminum to achieve a coating about 0.3 mil thick at approximately 40 lb pressure. The lacquer was applied with a conventional gun from a portable tank.

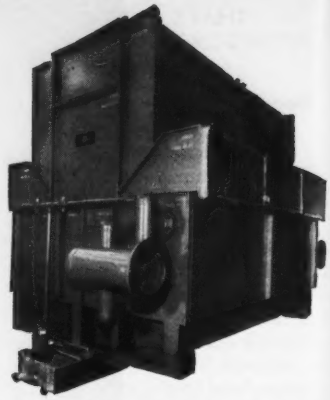
The entire project, involving the cleaning, surface restoration, pre-treatment, and subsequent coating of the building, covered a period of two weeks.

Results: The coating is non-yellowing under constant sun exposure and completely prevents oxidation of the surfaces. It resists the effects of atmospheric fumes and other weathering influences. The cleaning restored the original finish to the metal walls and the butyrate lacquer coating preserves the original finish against the effects of weathering with a minimum of maintenance.

(The half-second butyrate component of the lacquer which gives the formulation its characteristic, protective features was developed by Eastman Chemical Products, Inc., Kingsport, Tenn., subsidiary of Eastman Kodak Company, 260 Madison Ave., New York 16, N. Y.)

Check 1092 opposite last page.

ECONOMICAL COOLING OF GASES AND COMPRESSED AIR



Cooling gases or cooling and removing moisture from compressed air, the Niagara *Aero* After Cooler offers the most economical and trustworthy method. Cooling by evaporation in a closed system, it brings the gas or compressed air to a point below the ambient temperature, effectively preventing further condensation of moisture in the air lines. It is a self-contained system, independent of any large cooling water supply, solving the problems of water supply and disposal.

Cooling-water savings and power-cost savings in operation return your equipment costs in less than two years. New sectional design reduces the first cost, saves you much money in freight, installation labor and upkeep. Niagara *Aero* After Cooler systems have proven most successful in large plant power and process installations and in air and gas liquefaction applications.

Write for Descriptive Bulletin 130.

NIAGARA BLOWER COMPANY

Dept. CP-9, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 1093 opposite last page

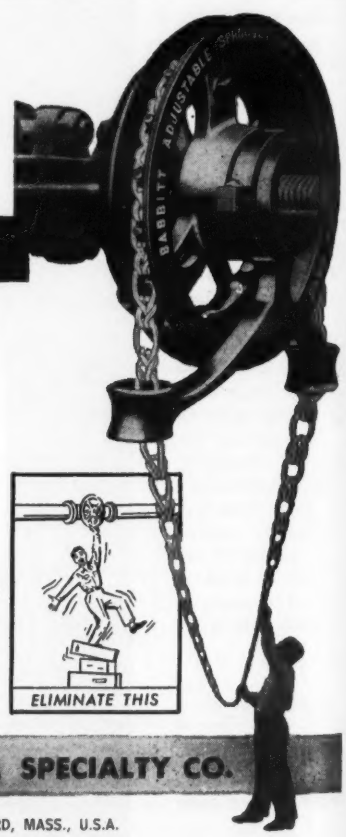
Safe Operation of Overhead Valves with a

Babbitt

Adjustable

SPROCKET RIM

with Chain Guide



- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
- Time and money saving fixture
- No maintenance; first cost *only* cost
- Packed, completely assembled, one to a carton
- Hot galvanized, rust-proof chain available for all sizes
- Easy to follow instructions with each unit
- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices

Babbitt STEAM SPECIALTY CO.

14 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

Check 1094 opposite last page

ARE YOU LOOKING . . .

for more information on any of the products or services mentioned in this issue of CHEMICAL PROCESSING?

Then make use of the Reader Service slip opposite the last page of this issue.

It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

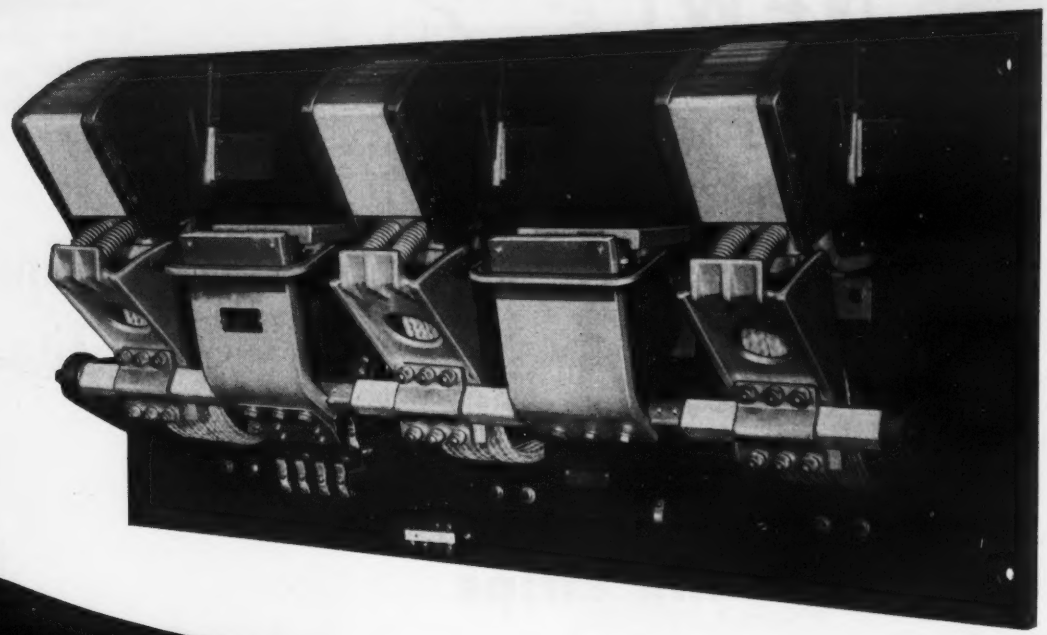
Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

Additional details will be sent direct to you.

Be sure . . .

to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at right, specify 1095 see information request blank opposite last page.



Rugged* Simplicity

Increases contactor life in motor starters

ONE look reveals the clean, balanced design of Allis-Chalmers contactors. Fewer parts eliminate many potentially troublesome areas — mean less wear. Simple, solid construction and high interrupting capacity are positive assurance of reliability.

When you specify starters be sure to get the long-life features provided by Allis-Chalmers contactors. It is these contactors that make the complete range of Allis-Chalmers low voltage starters, from Size 4 through 8, the dependable performers they are.

Get all the facts. Call your nearby A-C sales office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

*7th meaning, Webster's New Collegiate Dictionary, Second Edition.

A-5779

ALLIS-CHALMERS

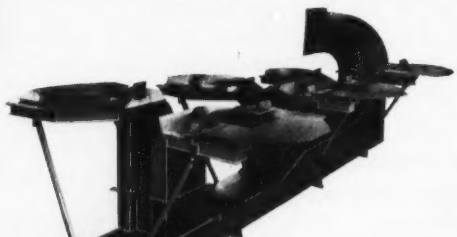
Van-Cor

90 and H Joining Strips

Revolutionary Method of Connecting PVC Sheet Stock—Van-Cor 90 and H joining strips use solvent welding to obtain maximum joint efficiency. They save time and money compared with hot air welding. Skilled welders are unnecessary—your own men can fabricate readily. On major installations using these Van-Cor strips, job costs have been cut over 30%!

Two Shapes—Three Sizes—Use 90 degree joining strips for making corners, H strips in a single plane. They handle sheet in ⅛", 3/16" and ¼" gauges. Both shapes available in Van-Cor 1 (normal impact) and Van-Cor 2 (high impact). Standard strip length is 10 feet.

For flanges and stiffeners of fabricated sections, extruded structural angles in 10 foot lengths are available in sizes 1½" x 1½" x 3/16" and 2" x 2" x ¼".



Write for Complete Data

INDUSTRIAL DIVISION OF . . .

COLONIAL PLASTICS MFG. CO.

Subsidiary of THE VAN DORN IRON WORKS CO.

2685 EAST 79TH STREET CLEVELAND 4, OHIO

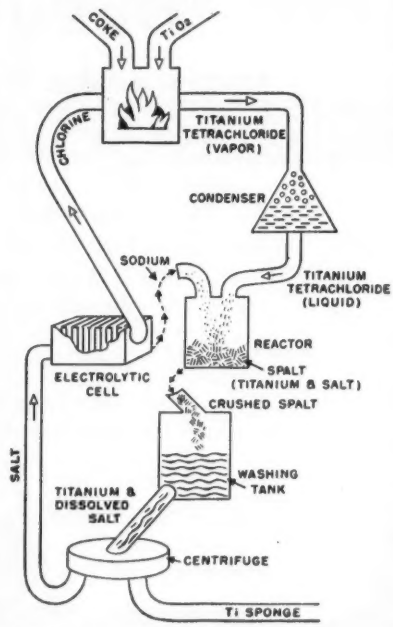
Check 1096 opposite last page

Producing high-grade titanium sponge by sodium reduction process, Electromet's giant plant is geared to consume 18,000 tons metallic sodium per year. Over two years successful operation prove that its methods are sound for . . .

Safe Handling of Sodium in Titanium Production

TED F. MEINHOLD, Associate Editor
with **JACK WINTERHALER,** Assistant to Works Manager
Electro Metallurgical Company, Division of
Union Carbide Corporation

Sodium, long handicapped by its intense reactivity and danger involved in handling it, has discarded its shackles. More and more chemical plants are now using it on a tonnage basis. Annual US production is currently between 125,000 and 150,000 tons. It costs only about 19 cents per lb — which definitely puts it into the low-cost raw material category.

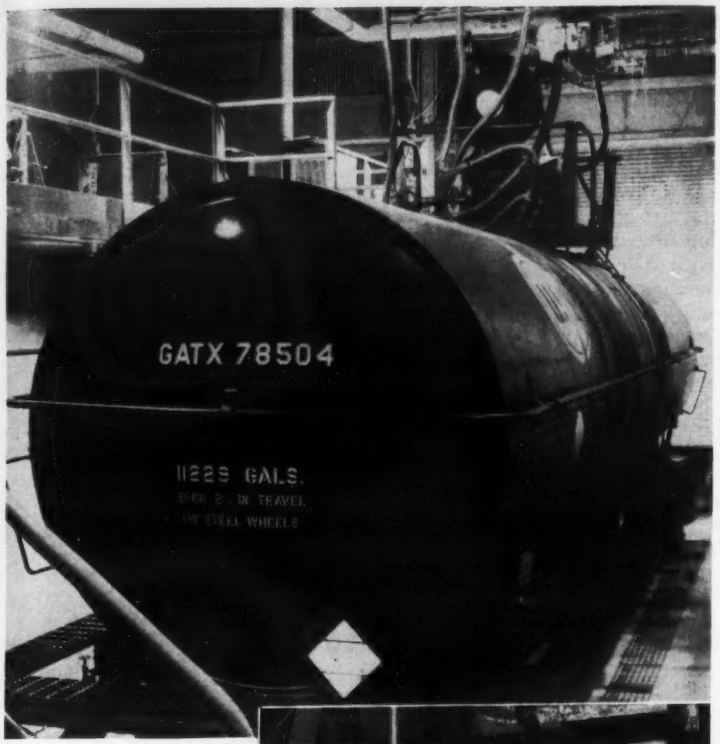


Here's how titanium raw material is transformed into titanium sponge by the sodium reduction process. Electromet's plant at Ashtabula receives the raw materials, sodium and titanium tetrachloride, in tank cars

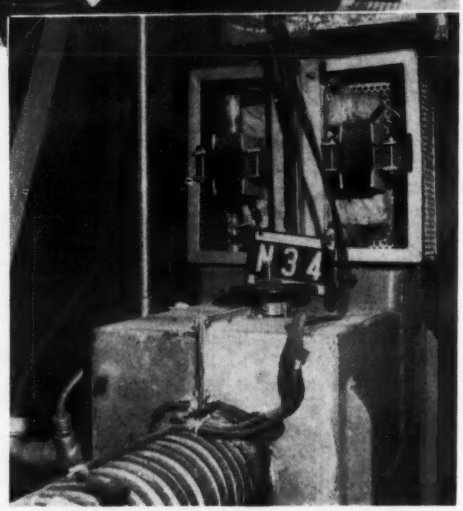
"Sodium handled correctly is sodium handled safely." This statement is being proven every day at Union Carbide's Electro Metallurgical Company's huge titanium sponge plant at Ashtabula, Ohio. When operating at peak capacity, it uses 18,000 tons of sodium per year — over 12 percent of the nation's total production! The plant was the first to produce sponge commercially by sodium reduction of titanium tetrachloride.

The largest titanium sponge plant in the US, the plant can turn out 7500 tons of top quality product per year. Due to government cutbacks however, it is currently operating at about ¼ capacity. The installation is located on a 112 acre site. It was completed in April 1956 at cost of approximately $31.5 million — all privately financed.

Electromet receives its sodium in tank cars. The more than 99.9% pure metal arrives in a solid state, blanketed with argon gas. Each car contains 80,000 lb sodium. Cars are equipped with channels on



Tank cars also serve as storage tanks for liquid sodium. Cars are heated by hot oil. Sodium is pumped out as needed



Electromagnetic pumps and induction-heated pipe (foreground) are "backbone" of sodium-handling system. Plant has over 25 pumps and 4000-5000 ft of pipe

outside of tank shell so that hot oil can be circulated to melt the product.

Unloading Tank Cars

Tank cars are prepared for unloading in individual, fireproof, concrete-enclosed sheds. Immediately upon arrival, the argon blanket in each car is checked and built up, if necessary, to 5-8 psi from plant's central system. Oil, at 125°C, is then started through car's heating channels.

It takes about 10-12 hours to liquefy a load. Oil is heated by passing it through steam-heated heat exchangers. System contains 3000 gal oil. Oil is circulated by means of 200-gpm centrifugal pumps.

After metal has been liquefied, discharge valve is opened and molten metal is forced by the positive pressure to electromagnetic pumps which transfer product through porous stainless steel filters into 1500-gal capacity weigh tanks. Sodium is then ready to be charged to reduction reactors. Tank cars double as storage tanks. The liquid sodium is

To next page

. . . a mildly alkaline solid; intermediate, catalyst, corrosion inhibitor—

SODIUM METHYL CARBONATE

2

Sodium Methyl Carbonate, $CH_3OCOONa$, is practically insoluble in many organic liquids, but is remarkably soluble in ethylene glycol and in glycerine. A relatively unknown and unexplored compound, it has an unusual combination of organic and inorganic properties.

Applications research on Sodium Methyl Carbonate continues at our laboratories. Some present and potential uses are: as an intermediate for preparing salicylates, ethylene carbonate, and benzyl carbonates; to neutralize weak acids; as a carbon dioxide source; to catalyze the alcoholysis of polyvinyl esters and glycerides; and to inhibit corrosion of anti-freeze cans. Write for Technical Bulletin C-910.

Phone: FOrest 4-1130 TWX: 117 Perrysville, Pa.

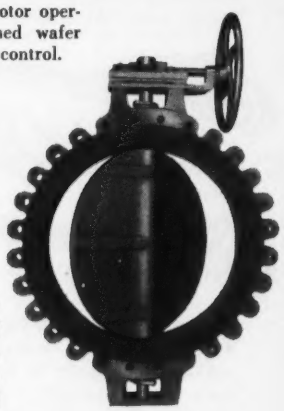
GALLERY CHEMICAL COMPANY
PITTSBURGH 37, PENNSYLVANIA

Check 1097 opposite last page

for heavy duty service

ROCKWELL "WAFER" VALVES

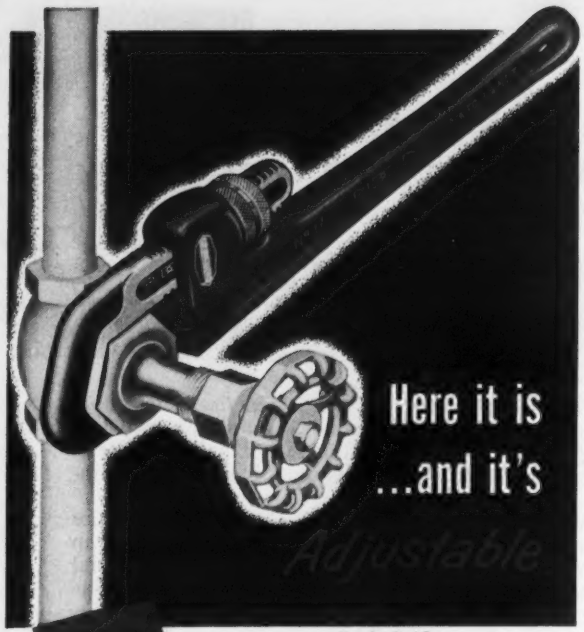
Wafer valve with air motor operator. *Right* — rubber-lined wafer valve with hand wheel control.



Compact, space-saving butterfly valves for dependable throttling and wedge-tight shut-off of air, gas, liquids and semi-solids at differential pressure to 150 psi and temperatures from minus 50° to plus 600°F. and higher. Manual or automatic operators. Standard sizes to 36" and larger special sizes. Write for Bulletin 580.

W. S. ROCKWELL COMPANY
2208 ELIOT STREET • FAIRFIELD, CONN.
Sales Representatives in Principal Cities

Check 1098 opposite last page

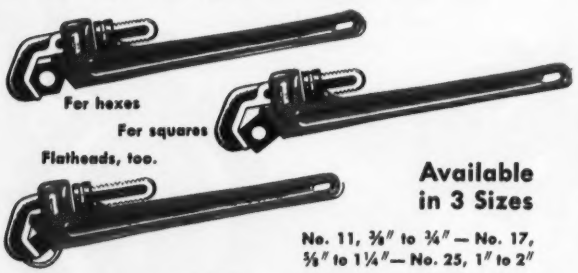


Pat. Applied For

RIDGID Hex Wrench

gives you Time-Saving, Positive, 4-Sided Grip on Hex Nuts, Square Nuts, Valve Packing Nuts, Unions, Gas Cocks

Here's the adjustable wrench you've always needed for hexes, squares and flatheads, rough or finished. Extra useful on every job. No more barked knuckles or rounded nut shoulders. New wide-open jaw goes on easy . . . won't slip off. 4-sided grip gives extra leverage. Stays to adjusted size during use.



Available in 3 Sizes

No. 11, ⅜″ to ¾″ — No. 17, ⅛″ to 1¼″ — No. 25, 1″ to 2″

Famous RIDGID heavy-duty construction with guaranteed housing. Narrow jaw design makes work easy in tight places even on thin nuts. Comfort-grip I-beam handle has handy hang-up hole. The new RIDGID Hex Wrench gives you more for your money than wrenches costing twice as much. Try it, buy it at your Wholesaler's.

Check 1099 opposite last page

NEW SOLUTIONS

From preceding page

pumped out only as needed.

Electromet believes that this is the first commercial installation where sodium is handled under pressure as opposed to the conventional method of vacuum transfer. Safe practices for handling the sodium under pressure were developed by Electromet during the break-in stage. At this stage it was necessary to train new crews formerly entirely unfamiliar with the handling of sodium, titanium tetrachloride, and argon.

Plant is also one of first to use electromagnetic pumps on a large commercial basis. It has over 25 pumps of this type installed.

Conduction-type Pumps Used

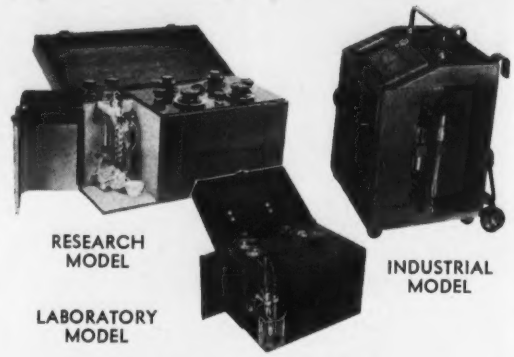
The electromagnetic pumps used to empty cars handle about 50 gal sodium per minute. Units develop 30-40 psi head. Pumps are AC conduction-type that operate on the basic principle of the "left-hand-rule". The liquid metal in pumping section serves as a conductor of electricity. When current is passed through it, perpendicular to magnetic field, a force is produced on the liquid metal which results in fluid motion within pumping section.

Flow rate is controlled by an adjustable autotransformer. Direction of flow of the liquid metal may be reversed by reversing direction of magnetic field with respect to direction of current through pumping section.

Pumps have no moving parts or packing glands. Each unit measures 29″ long, 23″ wide, and 30″ high. Weight is 800 lb. Power requirements are 150 amps, 60-cycle, 230 volts.

Pumps of this kind can be used to pump most any liquid metal which will wet the pumping section and which has a high conductivity. Pump tube must be non-magnetic and a material which will contain the liquid metal from a corrosive standpoint. Maximum operating temperature is 500°C. Electromet operates at 125°C.

Units are easy to install,



Cambridge pH Meters

The three portable models illustrated above incorporate new and important advantages. A.C. line operation eliminates battery nuisance. Laboratory and Research models use electron-ray tube for precise null-point indication. Industrial model is direct-reading, continuous-indicating; ruggedly built for plant use.

Accuracy: Research .02 pH, Laboratory .05 pH, Industrial .10 pH. Cambridge pH equipment also includes single- and multi-point indicators and recorders. Send for Bulletin 910-M.

CAMBRIDGE INSTRUMENT COMPANY, INC.

3541 GRAND CENTRAL TERMINAL, NEW YORK 17, N.Y.

Pioneer Manufacturers of

PRECISION INSTRUMENTS

Check 1100 opposite last page

LIGHT
BUT SO STRONG!
TOTELINE FIBERGLASS TRAYS
For Drying:
CHEMICALS
PHARMACEUTICALS
ANTIBIOTICS
They're feather-light, but they're durable and sturdy as any trays you've ever used! What's more, the large inside corner radii makes them very easy to clean. And, because fiberglass does not absorb heat, the materials dry faster in Toteline trays. Many sizes available. Write
TOTELINE
Wherever materials are handled
MOLDED FIBERGLASS TRAY CO.
World's largest producer of Fiberglass reinforced resin Trays, Tote Boxes
LINESVILLE, PENNSYLVANIA

Check 1101 opposite last page

either in hermetically-sealed loops or in open systems.

Smaller electromagnetic pumps, handling approximately 15 gpm, are used to feed sodium from weigh tanks into reactors. Magnetic flow meters are used to measure flow rate. Weigh tanks are kept hot by means of Calrod electric strip heaters.

Induction-heated Pipelines

To keep the sodium molten in its journey through the plant, Electromet uses a total of about 4000-5000 ft of induction-heated, 2" pipe. This is made of schedule-80 seamless steel, and except at valves and connections to equipment, is of all-welded construction.

Pipe is covered with 2" standard magnesia insulation and wrapped 14 turns per ft with induction winding. Heat input amounts to about 33 watts per ft. System has worked very satisfactorily and there has been little, if any, maintenance.

Pressure in the plant's sodium handling system is measured by means of bellows-sealed and diaphragm-type transmitters. System is also provided with bellows-sealed and air-operated valves. Numerous safety devices are installed to protect against hazards from leaks. These include alarms, automatic isolation valves, and stand-by, manually-operated valves.

(Electromagnetic pumps were supplied by MSA Research Corporation, Subsidiary of Mine Safety Appliances Company, Callery, Pa.)

Check 1102 opposite last page.

Sand reclamation story

Four-page bulletin describes sand reclamation system at a midwestern steel foundry. The simplicity, efficiency, and low cost of the system are effectively described and illustrated. Operation of scrubber unit is fully explained and illustrated. Bul F14-B5 — Denver Equipment Company, PO Box 5268, Denver 17, Colo.

Check 1103 opposite last page.

Cuts handling costs

How bulk receipt and pneumatic handling of beet sugar at the Cracker Jack Company have cut costs is described and illustrated in manufacturer's reprint. Flow diagram shows pneumatic-mechanical-gravity system which moves sugar from car to storage to process at big savings. Bul F-20 — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pennsylvania.

Check 1104 opposite last page.

Chlorosulfonic acid not too tough for Teflon-lined pipe

Eliminates iron contamination, improving product

Teflon-lined pipe is doing a satisfactory job handling technical grade chlorosulfonic acid at the Grasselli Chemicals Dept. plant of Du Pont in Linden, N. J. Pipe has withstood the acid at temperatures from ambient to about 95°C and pressures to about 60 psi.

Substitution of the TFE-fluorocarbon-lined pipe for alloy pipe formerly used has permitted plant to eliminate iron contamination and produce an extremely pure grade of CSA (far above average technical grade).

Several hundred linear feet of lined pipe in sizes 1½, 2, and 4" OD is used in the CSA Dept. Plant also uses about 5 feet of 1" pipe in service (two months so far) handling 70% HNO_3 at 80-110°C and a few pounds pressure. In reagent H_2SO_4 operation, some of pipe in 1½" size is used to handle SO_3 vapor at 50-100°C.

The lined pipe comes already flanged and ready to install, which considerably reduces labor requirements. This means that the installation must be accurately designed beforehand.

(Chemipipe® Teflon-lined pipe is product of Ethylene Chemical Corp., 245 Broad St., Summit, N. J.)

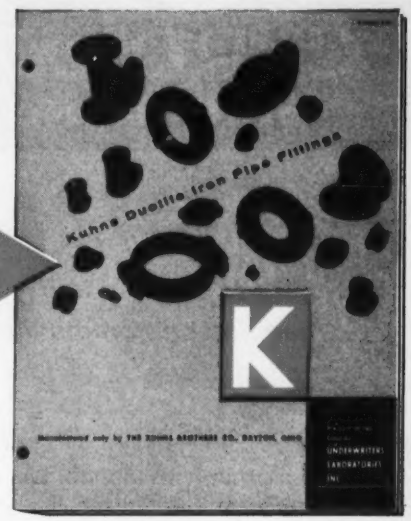
Check 1105 opposite last page.

WHAT DO YOU WANT TO KNOW ABOUT KUHNS

DUCTILE IRON PIPE FITTINGS?

THE ANSWERS ARE HERE

YOURS FOR THE ASKING!



Get complete data on—

- Types and sizes available
- Typical applications
- Safety factors and service ratings by Underwriters' Laboratories, Inc.
- Prices
- Physical properties; production control tests
- Specifications—A.M.S., A.S.T.M., Ordnance, Navy, Coast Guard, National Fire Protection Association, National Board of Fire Underwriters, Corps of Engineers
- Impact test data

DUCTILE IRON PIPE FITTINGS MANUFACTURED ONLY BY

THE KUHNS BROS. CO.
DAYTON, OHIO

THE KUHNS BROTHERS CO.
1800 McCall Street, Dayton, Ohio

Send me a free copy of Catalog 2-PF on ductile fittings.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

Check 1106 opposite last page

NATIONWIDE SERVICE
as and when you need it . . .

Use CARDOX bulk liquid CO_2 SYSTEM

The original bulk CO_2 system to simplify and streamline carbon dioxide supply and use . . .

- **No capital investment, equipment rental or upkeep cost to you***
- **Highest purity, moisture-free carbon dioxide**
- **Delivered promptly by the TON in ANY QUANTITY direct to your storage tank from sealed tank car or truck**
- **No in-plant labor or downtime**
- **Simple, dependable, economical**

To get the *most* from the bulk liquid CO_2 handling system, get CARDOX. Hundreds of plants now using CARDOX Bulk Liquid CO_2 will verify this statement! WRITE FOR FULL PARTICULARS TODAY.

CARDOX DRY ICE
is now available in most principal cities

DRY ICE DEPOTS AT:
Boston • Providence • Philadelphia • Jersey City
Detroit • Cincinnati • Indianapolis • Milwaukee • Chicago
Nashville • Memphis • St. Louis • Fort Worth • Phoenix
Los Angeles • San Diego • Oakland

* *Cardox* supplies the CARDOX Low Pressure Storage Tank, installs the System and maintains it for you. Based upon reasonable consumption requirements, all you pay for is the CARDOX CO_2 you *actually use*, at the low rates established in your contract. Prompt CO_2 delivery *always* from principal cities.

CARDOX CORPORATION
307 North Michigan Avenue
CHICAGO 1, ILLINOIS

Liquid CO_2 Supply Depots at: Boston, Mass.; Jersey City, N.J.; Philadelphia, Penna.; Suffolk, Va.; Cabin Creek, W. Va.; Barberton, Ohio; Detroit, Mich.; Cincinnati, Ohio; Chicago, Ill.; Memphis, Tenn.; St. Louis, Mo.; Tampa, Fla.; Ft. Worth, Tex.; Phoenix, Ariz.; Los Angeles, Calif.; San Diego, Calif.; Oakland, Calif.

Check 1107 opposite last page

$$$ savings achieved in reducing rock salt to slurry

Problem: Converting crude 1″ crystal rock salt to slurry required mixing and dispersing equipment to fit 40″ diam by 60″ high tanks. Operation was to be continuous.

Solution: Dissolver unit was selected having 10″ cast Stellite impeller. Baffles were installed in tank to direct oversize back more rapidly into impeller field. Provision was also made for continuous draw-off of slurry. Motor on dissolver is 15 hp, 1800 rpm.

Results: Unit does job quickly, efficiently, and continuously. Feed to tank is about 120 lb rock salt per minute. Five-minute retention time was found to be sufficient to give full and positive size reduction to salt.

Salt slurry (used as feed in electrolytic chlorine production) runs about 96% through 8 mesh. Recycle liquor is continuously separated from slurry and returned to feed line for reuse. Company has realized considerable savings by using rock salt (imported from West Indies) instead of domestic 200-mesh industrial-grade salt.

(Dissolvers are product of Morehouse-Cowles, Inc., 1150 San Fernando Rd., Los Angeles 65, California.)

Check 1108 opposite last page.

"Darling — you got the promotion!"

THAT'S INTERESTING

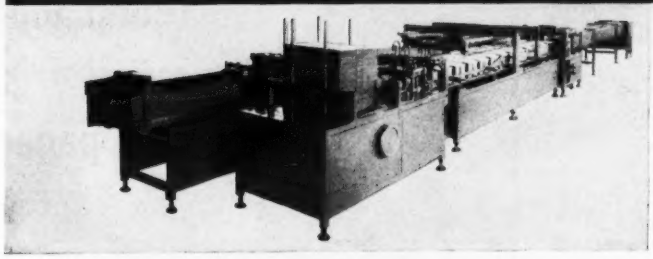
The erratic controller

Potentiometers, used to control voltage in many electric circuits, must often be discarded even though they still have a long life expectancy. Reason: after 100,000 revolutions of the contacts along the windings, not a long life for industrial use, the normally dependable characteristics become very erratic, making the instrument useless. Research is being conducted on the causes of variation. (*SRI Journal*, Stanford Research Institute)

Not without honor

The butt of so many jokes by localities and out-of-towners, Philadelphia water is appreciated after all — in Curacao. The Dutch colony in South America gets so little rain it sends tankers up the Delaware for water to feed its oil refineries. (*Our Sun*, Sun Oil Company)

For more information on product at right, specify 1109 see information request blank opposite last page.



Packomatic
T.M. Reg. U. S. Pat. Off.

equipment feeds, forms, positions, loads, seals, and imprints shipping containers automatically

PACKOMATIC GALLON-CAN CASE LOADER

Packomatics high-speed, continuous-motion case forming, feeding, loading and sealing machine, shown above, oiled the way at the Esso Standard Oil Company plant for faster fully-automatic casing of gallon cans. This is the only machine on the market designed for cost-reducing end-loading style corrugated shipping containers. Custom-Engineered to accomodate cans from the 12 oz. size to the 5-qt. Imperial gallon size, for an almost endless variety of products—from foods, juices and beer to paint, chemicals and cleansers.

J. L. FERGUSON CO. Joliet 6, Ill.

New York, Chicago, Cleveland, Boston, Tampa, Baltimore, Portland, Denver, Los Angeles, San Francisco, Seattle, New Orleans, Louisville, Kansas City and All Principal Canadian Cities.

PACKOMATIC machines include the Bale Sealer — Case Sealers — Opener-Loaders — Case Imprinters — Telescoping Volumetric Filler — Packer-Gluers. Units available, semi-automatic or fully-automatic depending on your needs.

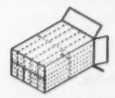
Just stack the magazines with "knocked-down" containers. The rest is automatic. With Packomatic Custom-Engineered equipment, containers are fed out, formed and positioned, end-loaded with cartons or cans, sealed and imprinted 4-sides (serial numbered, if desired) ready for shipment. Packomatics do the whole job—or any part of it. And how they pay off in any plant! End-loaded cases require up to 28% less board. Labor costs shrink dramatically and your packaging line keeps pace with your production line. Your Packomatic line can grow as you grow, too. Start now with a case opener and loader, or case sealer, or imprinter—build it unit by unit into a complete system.

Six 5-qt. cans or gallon cans in 20⅛" x 13½" x 9 1⅜₁₆" case and 20¼" x 13¾" x 8¼" case

Twelve 46 oz. cans in 21" x 13" x 7⅛" case

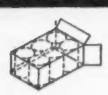
Twenty-four cartons in 12½" x 10⅝" x 8½" case

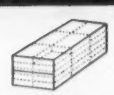
Eighteen 7 & 8 oz. cartons in 20" x 14⅛" x 8⅝" case


Sixty cigarette cartons King Size: 17⅞" x 11½" x 22" Regular: 14 1⅜₁₆" x 11½" x 22"

TYPICAL CASE LOADING PATTERNS FOR CANS AND CARTONS

Twenty-four 12 oz. cans in 16⅜" x 10 5⅛₁₆" x 5⅝₁₆" case


Six No. 10 cans in 22 1⅛₁₆" x 17⅜" x 7⅛" case

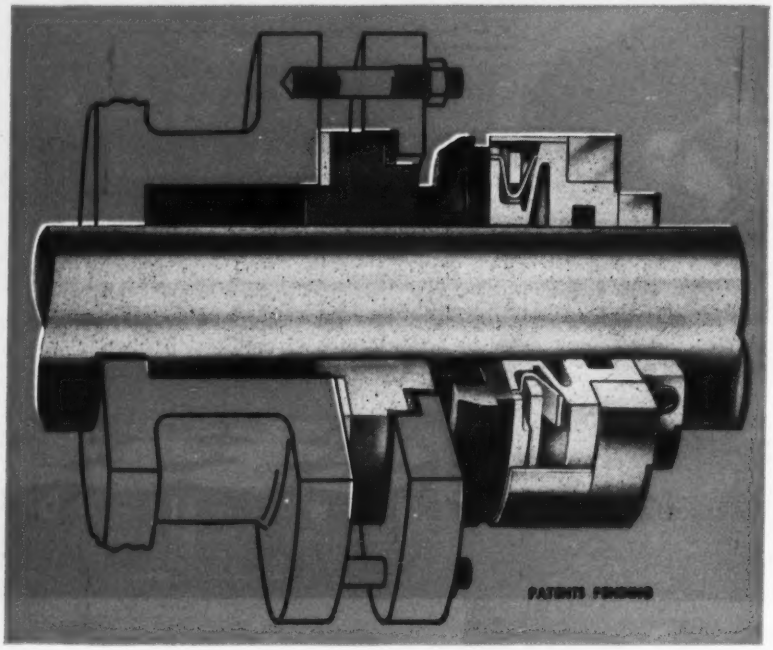

Thirty 1 lb. cartons in 16⅛" x 10 9⅛₁₆" x 7¼" case

Twenty-four cartons in 19½" x 10⅞" x 7" case

Forty-eight cartons in 23¾" x 23½" x 15⅞" case

BELMONT
"Chemical" SEAL

(PRESSURE BALANCED TEFLON BELLOWS DESIGN)



- **Greatest immunity to corrosion**
- **Longest useful life**
- **More economical than any other design or materials combination**

Customers report unsurpassed performance in difficult corrosive service with the BELMONT Chemical SEAL. A rotating mechanical seal, it employs a pressure balanced TEFLON* bellows design, free from the weaknesses (corrosion and flexural fatigue) of conventional metallic bellows.

Rotating with the shaft, only bearing surface is between rotating and stationary seal faces. No scoring of shafts. Will work satisfactorily on shafts previously scored by other seals or conventional packing.

Provides a perfect fluid seal without high friction load on the shaft and attendant high power costs. Greatly reduces hazards of handling flammable, explosive, corrosive and toxic liquids, and will handle abrasive slurries (when proper flushing means are provided). For pressures at the seal up to 100 psi at 75° C. Temperatures to 100° C at 75 psi. Standard sizes to fit shafts from ⅞" to 2¼".

Ask Your Belmont Distributor or write for Catalog T-57.

The Belmont Packing and Rubber Company
Butler & Sepviva Streets, Phila. 37, Pa.

* du Pont Trademark

BELMONT

Check 1110 opposite last page

NEW SOLUTIONS
of processing problems

Teflon tape eliminates buildup on paper mill rollers

Problem: A carrying roller on a Yankee paper machine in use at Badger Paper Company Mills, Pestigo, Wis., required periodic cleaning and scraping to remove clay sizing buildup.

Roller, located near the beginning of the drying sequence on the Yankee machine, sometimes had a buildup thick enough to open the fibers in the paper web. In some cases the buildup dried and had to be chipped off.

Problem was to keep the clay in the paper and reduce the time and attention needed to prevent buildup.

Solution: Roller was spiral-wrapped with Teflon pressure-sensitive tape in early November 1957. Plastic's anti-sticking characteristic made it a natural for this application.

When the tape was originally developed, however, this same easy release property made it difficult to find a suitable backing for it. A priming treatment is now used to anchor a silicone adhesive to the tape.

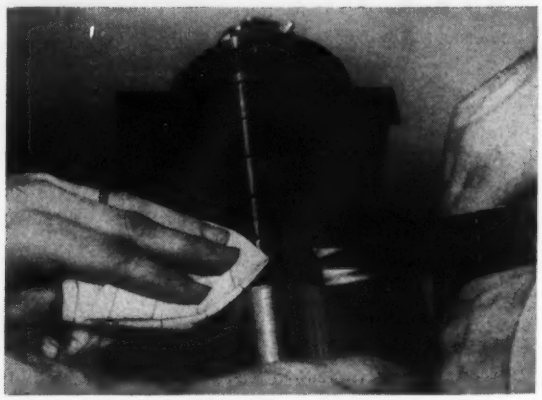
Tape is semi-transparent and blue-gray in color. It is made in thicknesses of 3½ and 6½ mils, in roll lengths of 36 yards, and widths of ¼ to 6". Tape has excellent chemical stability. It can be used continuously at −65 to 350°F and intermittently up to 450°F.

Tensile strength is 25 lb/inch width for the 3.5 mil and 40 lb for the 6.5 mil thickness. Adhesion is 20 oz/inch width. Elongation is 200% for the 3.5 mil and 150% for the 6.5 mil. High elongation gives tape good conformability, allowing it to be effectively used for covering irregular or curved surfaces.

Results: Running conditions

Note clean appearance of overhead carrying roller wrapped with Teflon tape (right) in service at Badger Paper. Roller at left, while not bothered with buildup to extent of one on right, still illustrates the difference between a protected and an unprotected roller

Two men can tape an average carrying roller in 20 to 30 minutes with the tape in place on the machine. One turns the roller by hand, rubbing the tape down with a soft cloth, while the other holds the tape roll under a slight tension as he guides it to make a proper overlap



Non-sticking property of tape greatly reduces cleanup time and increases machine efficiency

have been greatly improved at Badger. Cleanup time has almost been eliminated.

Teflon tape has also been successfully used at other paper companies. At Fitchburg Paper Company, Fitchburg, Mass., the tape was used to spiral-wrap a Mt. Hope expander roller, used after the size-press operation. This roller had been building up an excessive amount of starch. It required frequent cleaning, which meant a considerable amount of lost time. At this plant, Teflon tape paid for itself the first day.

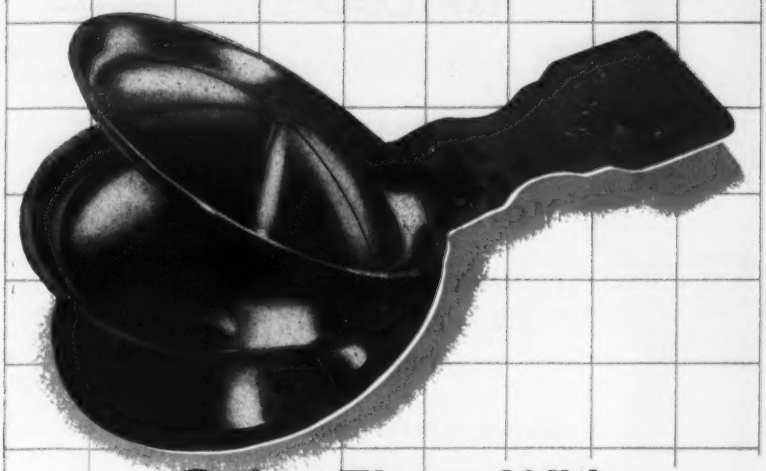
Teflon tape has also been effectively used to eliminate static electrical attraction between machine parts and certain products being processed. It is used on waste chutes and cutting bars of a fabricating machine for this purpose at Diana Mfg. Co., Green Bay, Wis. Previously, the material — soft, matted paper fibers — clung to disposal chutes and would leave fiber attached to cutting blades.

At this same plant on another machine — which makes sanitary napkins — Teflon tape is applied to a small carrying roller which feeds a continuous glue-impregnated thread into the napkin pads. Before the tape was used, machine had to be shut down about 10 minutes every hour to clean glue from the roller. Downtime for cleanup was eliminated when tape was applied to the small roller. Use of tape permits a 16% increase in production.

(No. 549 Teflon tape is product of Minnesota Mining and Manufacturing Co., 900 Bush St., St. Paul 6, Minn.)

Check 1111 opposite last page.

"Difficult" Pressure Protection Problems?



Solve Them With...

BS&B *Safety Heads!*

BS&B's D and DV Rupture Discs, which are fully interchangeable in BS&B Safety Head flanges with conventional type pre-bulged discs, are engineered to give highly desirable Safety Head protection to those pressured systems in which one or more of the following "difficult" conditions prevail:

1. When operating pressure must be close to relief pressure.
2. When high operating temperatures are involved.
3. When alternating pressure and vacuum prohibits the use of standard one-layer rupture discs.
4. When pulsating pressure conditions prevail.
5. When a combination of metal and plastic disc construction is needed to obtain lower rupture pressures.

BS&B D and DV Rupture Discs have these advantages:

1. Fast action and unrestricted relief openings.
2. Wider rangeability in selection of metals and plastics for disc components.
3. Longer service life.
4. Rugged construction for added protection against possible damage by rough handling.

BS&B — ANOTHER EXAMPLE OF PRODUCT LEADERSHIP

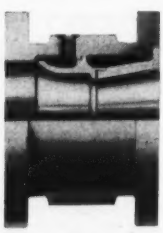
Let BS&B Safety Heads solve your pressure protection problems. Our engineers will gladly evaluate your pressure system to assist you in proper selection of Safety Heads.

BLACK, SIVALLS & BRYSON, INC.

Safety Head Division, Dept. 2-M9
7500 East 12th Street
Kansas City 26, Missouri
Telephone: BEnton 1-7200

Check 1112 opposite last page

Highest efficiency in the shortest laying length—less weight—easier to handle and install and low cost. Laying length is identical for each line size regardless of throat area ratio. Based on modern hydro-dynamic principles, the new "TWIN-THROAT" Venturi produces a higher differential pressure for a given throat than is possible with ordinary types—without increasing the head loss.



The "TWIN-THROAT" Venturi can be utilized for metering water, sewage, air and other fluids and gases. It is available in a full range of sizes from 4" through 48". Standard construction is grey iron with bronze inserts. Also available in cast steel and alloys. Brochure giving technical data, complete with performance graphs, dimensional data, etc., will be sent free upon request. Write today for Bulletin 1021.

58531

Infilco Inc., General Offices: Tucson, Ariz., P.O. Box 5033
Field Offices throughout the U.S. and in foreign countries

THE ONLY COMPANY impartially offering equipment for ALL types of water and waste processing—coagulation, precipitation, sedimentation, flotation, filtration, ion exchange and biological treatment.

Check 1113 opposite last page

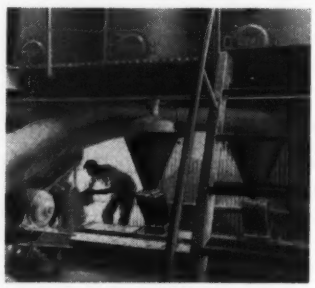
NEW SOLUTIONS

Talc dust recovered, sold as valuable by-product

Efficient filter traps 12½ tons material per month

Problem: An efficient way of recovering waste super-fine steatite talc dust was sought by Tri-State Minerals Company at their talc grinding mill near Dillon, Montana. Particle size of material averages 99.90/400. This means that 99.9% of dust will pass through a mesh screen 400 squares per inch.

Particles are so light that only a small percentage will settle out of the forced air current which carries regular-grade talc from plant's mill to the cyclone bin. Without a method of drawing the waste dust from the airflow system, most of it would continue to circulate through system. Plant costs would eventually increase through excessive dust build-up on surfaces and machinery.



Super-fine talc dust travels to filtering compartments via 16" suction line at left

Solution: Company installed a five-compartment dust collector to recover the dust. Equipment traps dust via a 16" suction line hooked into plant's airflow system between mill fan and mill.

In plant's production cycle, crude talc is crushed into 1" pieces before it is conveyed to mill feed bins. Magnetic vibrating feeders draw talc to central feeder which leads to roller mill. After product is ground to desired degree of fineness — ranging from 96.50/200 to 98/325 — a forced air current carries it up to

To page 86

PROCESS ENGINEERS . . .

here's a money-saving tip on small valves

You can stop worrying about heavy-handed operators ruining the stem points and seats on your small valves when you install Hoke's new 270 Series bar stock valves with plastic pointed stems. Let them "tighten down" all they want, because these long-wearing nylon or corrosion-resistant Kel-F tips have taken 700 cycles of operation at 3500 psi using twice the normal closing force—and the valve did not leak across the seat. They'll save you money three ways—cutting valve replacement, down-time and maintenance.

Use this new Hoke valve for vapor or vacuum leak-tight closure, in service up to 5000 psi. It also minimizes opening pressure surges, and meets applicable MIL specs for use on high pressure compressors. Available in ⅛" or ¼" sizes, globe or angle pattern, with O-ring or Teflon packing. All valves can be panel-mounted.

Complete information is yours on request. Write us today.

Why buy big when you can buy small

HOKE

HOKE INCORPORATED
FLUID CONTROL SPECIALISTS
145 South Dean Street
Englewood, New Jersey

Visit Hoke's Booth #1532 at the ISA Show Sept. 15-19.

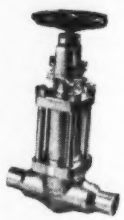
Check 1114 opposite last page

PROCESS PIPING POINTERS

Self-draining diaphragm valve for wine cargo handling

A new bulk wine ship prevents valve corrosion with this angle pattern diaphragm valve with Type 316 stainless body. Employs newest design with Teflon diaphragm functioning as bonnet seal only, and not subject to crushing against weir on seating. Disc, with Teflon insert, is separate member and holds fluid even should diaphragm fail. Angle pattern is compact and provides better drainage for shipboard usage. For more information, see below.

Bellows design puts positive hold on high-pressure Freon



Good example of what's being done in special development for unusual fluid control needs is this 600-pound bellows-sealed valve for the hard-to-hold Freon refrigerant. Body material is forged steel; disc is Kel-F. In addition to 18-8 stainless bellows seal, packing is used to seal stem as a safety factor, in case of bellows failure. Valve shown is 1-in. size with welding ends. For more data, see below.

Refinery saving 500% plus in valve replacements on hot sulphuric acid

Shown are valves installed more than 3 years ago in a Texas oil refinery on varying concentrations of sulphuric acid. Never out of service . . . completely trouble-free, these valves to date have outlasted all other makes used, more than 6 to 1. For complete facts, see Crane ad on next page.

For literature or data on product listed above, please contact J. E. Bradbury, Manager, Chemical Sales Dept. No obligation.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5

VALVES • FITTINGS • PIPE

PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Branches and Wholesalers Everywhere

Check 1115 opposite last page

CUT HERE AND FILE

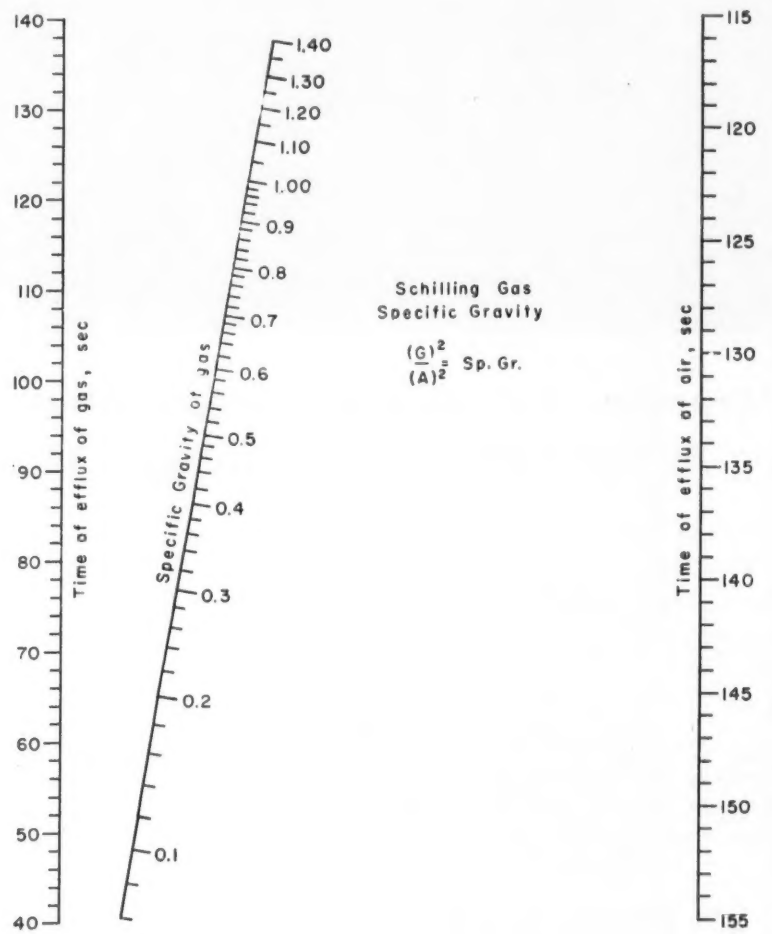
Gas Specific Gravity by Schilling Method

O. M. DUNCAN
Indiana Farm Bureau Refinery
Mt. Vernon, Ind.

In determining specific gravities of gases by the Schilling Method, the efflux time for a given volume of gas through a small orifice is compared with the time for the same volume of air at the same temperature.

The square of the time, G, for the gas divided by the square of the time for air, A, equals the specific gravity of the gas at that temperature.

To use the chart, connect efflux time for the gas on the left side of the chart with the efflux time for air on the right side. Where straight edge crosses the sloping line, read specific gravity.



Texas City Refining Inc. cuts valve replacement cost 500% plus

"Craneloy 20" valves on sulphuric service outlast valves formerly used 6 to 1

Handling sulphuric acid in varying concentrations is tough service for any valve.

At this Texas City, Texas, refinery, valves used on lines from sour water strippers never lasted more than 6 months. It was a case of "install today . . . replace tomorrow."

Three years ago, "Craneloy 20" gates were selected for this service. These high-nickel, high-chromium stainless valves, with rotating split-wedge disc seating, have given trouble-free service ever since. No leakage, no galling or seizing; and always operating smoothly.

To date, "Craneloy 20" valves have outlasted the other make valves 6 to 1—better than a 500% saving in replacement and maintenance cost.

If you're having trouble with valves on sulphuric acid or similar corrosive fluids, your Crane Representative has all the information on the "Craneloy 20" line.

Bring yourself up to date on corrosion-resistant alloy valves. Send for this Crane Circular AD-2080 today.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Check 1116 opposite last page

NEW SOLUTIONS

From page 84

cyclone bin. Forced air is returned to mill fan.

Super-fine dust particles are withdrawn from airflow system by means of fan driven by 15 hp motor. Dust-laden air is drawn upward to an intake manifold for distribution to each of five filtering compartments.

Results: Collector recovers five hundred 50-lb sacks of dust per month. This represents about 1¼% of plant's total monthly talc production.

The recovered super-fine talc dust has turned into a valuable by-product. It is a highly desirable ingredient for paints and allied products. It mixes better and stays in suspension longer than the regular production-grade talc.

Filtering-cleaning cycle of collector is automatic. While four compartments are filtering, fifth is shut down for cleaning. Pneumatic mechanism shakes bags. Dust shaken down is gravity-fed into screw conveyor which carries it to special bagger bin.

Maintenance during collector's first year of continuous operation has been negligible. Only two of original 120 filter bags needed replacement.

(Further information about Dustomatic filters can be obtained from Dracco Division, Fuller Company, P.O. Box 1794, Cleveland 5, Ohio.)

Check 1117 opposite last page.

Handling time cut 25%

Material handling survey from manufacturer describes how fork lift trucks equipped with hydraulically-operated clamps handle loads of glass containers with ease, reducing handling time 25%. Complete details regarding economies of system are contained in Certified Survey 176 — Towmotor Corporation, 1226 East 152nd St., Cleveland 10, Ohio.

Check 1118 opposite last page.

For more information on product at right, specify 1119 . . . see information request blank opposite last page.

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared by U. S. Industrial Chemicals Co.*

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Historical Study Indicates That Chemist Creates Most Between Ages 30 and 34

A recent study of 2,500 of the world's ablest chemists, now deceased, reveals that collectively these men did most of their important creative work between the ages of 30 and 34. Dr. Harvey C. Lehman of Ohio University, in reporting his findings in the May issue of Science magazine, says "The more brilliant the chemist, the earlier the age at which he gives genuine indications of his future greatness." " . . . after he has passed his thirties, the production rate for the most brilliant chemist's extremely important creative work tends to fall off both earlier and more rapidly than does the production rate for his own less brilliant output."

Dr. Lehman's data is drawn from 44 histories of chemistry written by German, French, American, English and Italian authors.

Plan ACS Subdivision of Organometallic Chemistry

At the American Chemical Society meeting in San Francisco this past April, the Division of Inorganic Chemistry proposed that a Subdivision of Organometallic Chemistry be set up. Action was deferred due to the newness of the Division itself, but interest continues high and indications are that the Subdivision will be formed within the next few years.

In the meantime, a day-long organometallic symposium will be sponsored by the Cincinnati ACS section on October 29, and a second Symposium on Organometallic Chemistry has been planned for the April 1959 ACS Meeting in Boston. It is felt that the field is growing rapidly enough to warrant *consistent* presentation of papers on organometallics — compounds having metal to carbon bonds.

Probably the oldest and best known organometallic compounds are the Grignard rea-

MORE

Glass Fibers Improve Compression Properties Of Polyurethane Foams

Studies now being conducted by a glass fiber producer and a supplier of urethane foam raw materials indicate that addition of 5% by weight of fiber to foam increases compression set, compressive strength and resilience. Also, per cent elongation is reduced — all without affecting density, porosity or resistance to humidity aging.

In these experiments, polyester-type urethane foams have been combined with glass fibers of various sizes to give varying results. It has been found that in cushioning, for example, ⅛-inch fibers eliminate "plateau" and cut hysteresis loss, while increasing compressive strength from 0.46 to 0.68 psi. For shock absorbers, 1/32-inch fibers give high hysteresis loss, high compressive strength and low per cent elongation.

CPI Helps Its Own Baby Grow

Employs More and More Polyethylene for Equipment, Packaging and Protection; Finds Toughness, Corrosion Resistance, Moisture Barrier Properties Most Valuable

One of chemistry's own products — polyethylene — is changing chemical shipping habits, cutting laboratory hazards and reducing plant maintenance headaches. With plenty of the plastic available — production reached 630 million pounds in 1957—engineers in the Chemical Process Industries are becoming polyethylene-minded. They are continually looking for, finding and developing new uses for this tough, corrosion-resistant, inexpensive resin within the industry.

Shipping Chemicals in Polyethylene

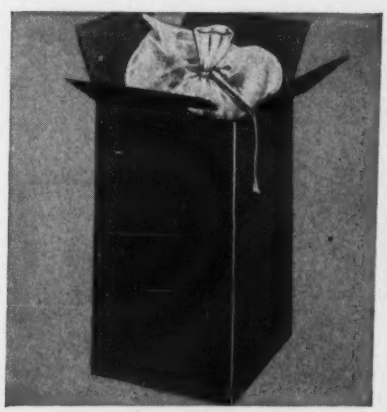
Chemical manufacturers are packing and shipping both solids and liquids in a wide variety of polyethylene packs and polyethylene-lined and coated containers. Combinations of flexible bag and cardboard box, for example, are being used to transport fluids from producer to chemical consumer — without losing a drop. Even polyethylene is shipped in polyethylene-coated bags. Increasing utilization of the resin is based on its moisture barrier characteristics, corrosion resistance, toughness, nonbreakable properties, light weight and low cost.

The government gave its blessing early in 1955, when the Interstate Commerce Commission approved shipment of nonregulated chemicals by road and rail in molded polyethylene drums. Last year these drums were OKed by the ICC for regulated products such as alcohols, acids and other corrosive liquids, sodium chlorite solutions and hypochlorite solutions.

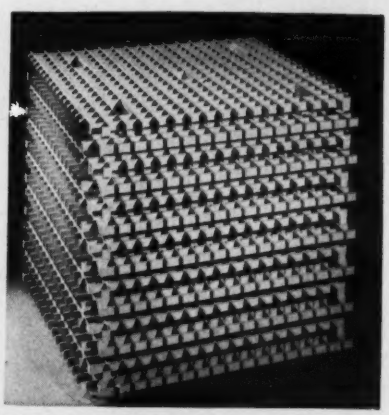
Processing and Laboratory Equipment

A glance through any catalog of laboratory ware these days reveals that polyethylene is replacing glass wherever possible, to cut down on breakage. And for corrosive service, the chemist can now obtain items such as valves, pumps, sink traps and blade stirrers molded of polyethylene. Among the most recent developments in laboratory equipment is the polyethylene fume hood, including stacks, fans

MORE



Package for liquid chemicals combines pinhole-free polyethylene bag and corrugated box.



Polyethylene grid packings for water cooling towers. (Photo courtesy Fluor Products)

Extra-wide polyethylene film can serve as a temporary protective cover for materials or equipment.

U.S.I. CHEMICAL NEWS

CONTINUED

Polyethylene

and fittings. Here a service life of at least 20 years is expected from the resin.

More and more, polyethylene is showing up in the chemical plant in process equipment for corrosion resistance. One chemical plant is using polyethylene pipe to carry brine between two processing units, and steel pipe coated on the outside with polyethylene has been developed for underground use.

Polyethylene has been bonded to steel as a lining for storage tanks, piping, tank cars, process vessels and tank trucks. It has been woven into filter cloths, molded into waste and drainage systems, pump bodies, cooling tower grids and packings.

Polyethylene Film Gives Protection

Lengths of heavy-gauge, extra-wide polyethylene film are being employed in the chemical industry for all sorts of temporary situations and emergency problems. They are protecting equipment and bulk raw materials against dust and moisture in storage or transit, keeping personnel warm and dry during open air operations, providing temporary shelter after explosion or fire, lining ordinary vessels temporarily for corrosive service.

And the end is not yet in sight. Polyethylene producers are working constantly with engineers to use the resin's valuable properties more fully in the industry of its origin.

CONTINUED

Organo-Metallics

gents (organomagnesium halides) and tetraethyl lead. Recently, complexes of aluminum, boron, tin, manganese and other metals have become important as catalysts, intermediates, additives and end products in plastics and resin manufacture, the jet aircraft field and a host of other industries.

Organosodium compounds are being used as an economic route to other organometallics. Prepared from alkyl or aryl halides and finely dispersed sodium, the organosodium compounds are reacted with metal halides or alkoxides to yield otherwise hard-to-make Grignards, and valuable compounds such as lithium alkyls, dibutyl aluminum chloride, triphenyl boron and dibutyl tin.

Plant Demonstrates Ideal Handling of Bulk Sodium

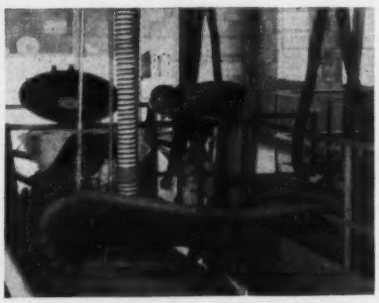
A model installation for receiving, pumping, filtering and storing tankcar quantities of sodium is now in operation at the zirconium plant of Mallory-Sharon Metals, Ashtabula, O.

This installation is designed to transfer two million pounds a year of metallic sodium — in 80,000-pound chunks — from tankcar to storage to process without contaminating the metal or bringing it into contact with any outside material. Here's how it works!

The railroad car, containing solid sodium under argon, is run into a receiving shed about 50 feet from the process building. Adjoining the shed are areas for oil storage, heating and pumping; sodium pumping, filtering and storage; and argon gas handling. Lines for argon, heating oil and molten metal connect the shed to these areas. The lines are attached to the car.

Hot oil is pumped to the tankcar heating coils, melts the sodium and heats it to 250°F. Argon is forced into the car to push the molten metal up into the sodium line, from which it is pumped electromagnetically through filters to storage. Complete instrumentation assures constant control of all variables.

The installation incorporates the most advanced techniques of sodium handling developed over the years by U.S.I. To help others working with large quantities of sodium, U.S.I. offers a booklet "Handling Metallic Sodium on a Plant Scale."



View of top of tankcar in shed shows connections for sodium, heating oil, argon. Sodium lines are heated via A.C. induction coils.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Isophthaloyl and terephthaloyl chlorides of 98% minimum purity are now in pilot plant production. Suggested as raw materials for fibers, films, protective coatings. Claimed to have greater reactivity than corresponding acids. **No. 1380**

Uses of permanent, non-electric magnetism in modern materials handling and magnetic separation equipment described in new, 48-page, free booklet. Covers chemical, plastics, food, ceramics, textile, paper fields among others. **No. 1381**

New adhesive for bonding polyethylene linings to steel tanks and other surfaces is a one-part, self-vulcanizing material. Need for primers on metal or plastic is eliminated. Bonds are temperature-stable, remain flexible. **No. 1382**

Microfilm storage is the subject of a new American Standard, drawn up for the purpose of protecting microfilm against humidity, temperature, dust and gas. Inspection methods are included. Copies can be purchased. **No. 1383**

Ethyl-di-n-propylthiolcarbamate, a selective herbicide for most grassy weeds, has just been registered by the Dept. of Agriculture for use with crops such as beets, flax, corn, beans. Limited quantities are being offered for sale. **No. 1384**

Three new synthetic polysulfide rubber caulking compounds are available which are said to have 400 to 500% elongation, excellent weathering, water resistance, flexibility. Can be used on metals, wood, clay products, glass. **No. 1385**

Proceedings of the 1957 Conference on Precautionary Labeling have now been published as a 52 page book which can be purchased. Includes all papers presented plus a list of those who attended. **No. 1386**

Glycol di-mercaptoacetate, a new dithiol just introduced, can act as a cross-linking agent and monomer for special polymerizations by addition across ethylenic unsaturation, and by reaction with active halogen. **No. 1387**

New non-flammable, cold solvent stripper for epoxy enamel coatings is designed for many of the newer epoxies usually very difficult to remove. Coatings are rapidly wrinkled and detached from base metal, rather than dissolved. **No. 1388**

Special 99% pure cetyl alcohol is now on the market which is claimed to meet or exceed the high standards of the Toilet Goods Association. Lead content is said to be 1 ppm max., arsenic content 1 ppm max. as As_2O_3. **No. 1389**

PRODUCTS OF U.S.I.

POLYETHYLENE RESINS

PETROTHENE® 200 Series — high quality resins for extrusion, injection and compression molding, film extrusion, paper coating, blow molding.

PETROTHENE 300 Series — special resins for electrical insulation use.

PETROTHENE 560 Series — black, compounded resins for pipe and mulch-film extrusion.

OTHER PRODUCTS

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Alcohols: Ethyl (pure and all denatured formulas); Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P., Pelargonic Acid, and 2-Ethyl Heptanoic Acid.

Animal Feed Products: Antibiotic Feed Supplements, BHT Products (Antioxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadione (Vitamin K_3), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixes, U.S.I. Permadry, Vitamin B_{12} Feed-Supplements, Vitamin D_3, Vitamin E Products, Vitamin E and BHT Products.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corporation
99 Park Avenue, New York 16, N. Y.

U.S.I. SALES OFFICES

Atlanta • Baltimore • Boston • Buffalo • Chicago • Cincinnati
Cleveland • Dallas • Detroit • Houston • Indianapolis • Kansas City, Mo.
Los Angeles • Louisville • Minneapolis • Nashville • New Orleans
New York • Philadelphia • Pittsburgh • Portland, Ore. • St. Louis
Salt Lake City • San Francisco • Seattle

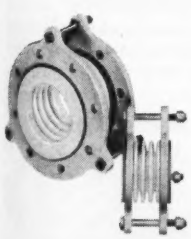
CHEMPRO
STYLE 20
TEFLON -JACKETED
HEAD GASKETS

Shipment from Stock

ALL SIZES
(Including 12" x 16" Elliptical Manhole Gaskets)

For All Makes of Glass-Lined Kettles, Mixers, Reactors, Heat Exchangers, Distillation Columns and Retorts.

also COMPLETE STOCK OF CORROSION-RESISTANT
CHEMPRO TEFLON
EXPANSION JOINTS



From 1"-6"
PIPE SIZES

*duPont Trademark

CHEMICAL & POWER PRODUCTS, Inc.
9 Broadway, New York 4, N. Y.

Check 1120 opposite last page

CUT HERE AND FILE

Hexane Humidity Nomograph

STUART STERN and PAUL BUMBLE
Wyssmont Company, Inc.
Long Island City, N.Y.

Humidity charts for only a limited number of liquids have been published. Without these charts, the psychrometric equation[1] must be solved by time-consuming calculations.

This nomograph is construction from well known relationships[2] and offers rapid solution to humidity problems concerning hexane at one atmosphere total pressure.

Typical Examples

Problem: Determine absolute humidity and partial pressure of hexane in air at 75°F wet bulb and 152°F dry bulb.

Solution: Connect above dry bulb and wet bulb temperatures and read absolute humidity of 0.42 lb hexane per lb dry air and partial pressure of 94 mm Hg.

Problem: Determine saturation humidity and partial pressure of hexane at 75°F.

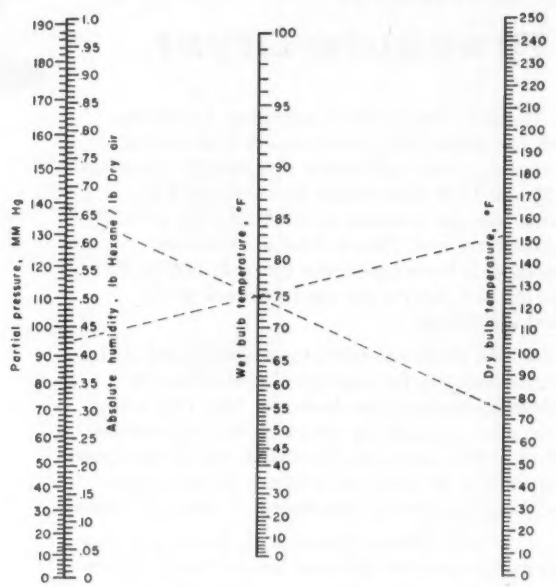
Solution: Connect above temperature on both wet and dry bulb scale and read 0.66 lb hexane per lb dry air and vapor pressure of 138 mm Hg.

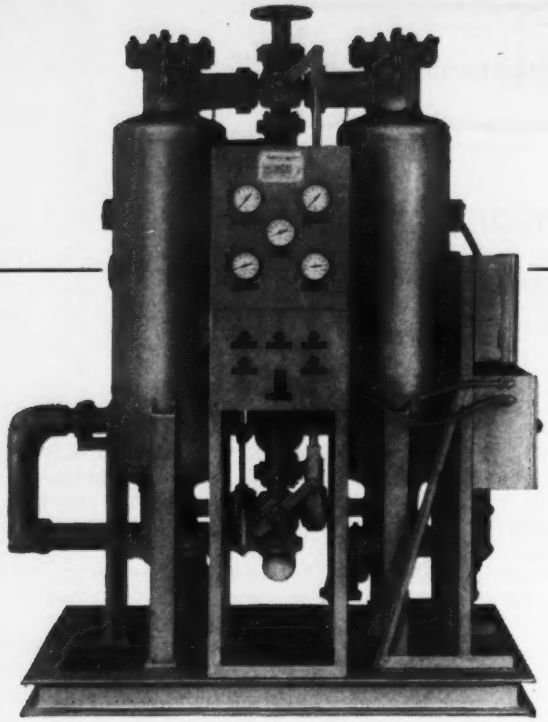
Problem: Determine relative saturation of hexane in air at above wet and dry bulb temperatures.

Solution: Relative saturation equals partial pressure of vapor present (94 mm) divided by partial pressure at saturation (138 mm). Relative saturation = 100 x 94/138 or 68%.

LITERATURE CITED

1) BROWN, G. G., et al, "Unit Operations," pp 546-7, John Wiley & Sons, Inc., New York, 1950
2) STERN, S., Chem. Engr., Feb 1954, pp 188-9





Take a second look

At the Anders High Pressure Dryer

Anders High Pressure Dryers are continuous air drying units in which the adsorption, reactivation and cooling cycles are automatic, semi-automatic or manual. Capacities of standard Model IFH units range from 160 SCFM (standard cubic feet per minute) to 1,000 SCFM, at 90 F inlet air temperatures and 100 psi inlet air pressure. Other Anders models have capacities up to 11,500 SCFM and pressures up to 6,000 psi for use in missile work for helium and air drying.

Each dryer has two desiccant-filled towers equipped with internal electrical heaters for regeneration that can be replaced without disturbing the desiccant bed. One tower dries incoming air . . . while the second tower regenerates desiccant. Model IFH units, as illustrated, can be equipped with external coolers, so there is no bleed. All air or gas is retained within the unit for processing . . . none is wasted.

Look again . . . at the Anders approach to your air drying problems. Write for detailed information to Anders Lykens Corp., division of Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pennsylvania.

milton Roy
ANDERS AIR and GAS DRYERS

Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • Anders Air and Gas Dryers

Check 1121 opposite last page

Compact, easy-to-use kit analyzes lead-in-air, assures safety at Du Pont

Device is adaptable for other uses

A compact, lightweight, easy-to-use kit makes lead-in-air analysis almost a "breeze" at Du Pont's Chambers Works plant. Used for making safety checks of the atmosphere in such manufacturing areas as those involved in the production of tetraethyl lead, the simple device was developed by Du Pont's Industrial Hygiene Laboratory in collaboration with the company's Petroleum Chemicals Division.

Heart of the kit is simple jet "engine" device, or air

Light, easy-to-operate air-sampling device can be hooked to safety belt

pump, which takes the place of a bulky, hand-operated sampling pump previously used. A more foolproof and accurate device for collecting the air sample, the vapor-powered unit eliminates the possibility of human error connected with the hand-pump operation.

The lead-in-air sampling kit consists of an aspirator with three disk plates providing orifice sizes of 0.006, 0.008, and 0.010"; one all-brass

To page 90

THE LEGENDARY FIREBIRD, the Phoenix, rose young and strong again and again from flames . . . This is the Norton Firebird — symbol for the exciting new fused materials made in Norton's electric furnaces.

electrochemicals
. . . gifts of the firebird

New booklet on
BORON
Compounds
and other
electrochemicals

Born in flames, like the legendary Phoenix, Norton electrochemicals gain new power to perform new wonders. In Norton electric furnaces they are transformed into new high-purity compounds of tremendous importance.

A quarter century ago, Norton began developing stable boron compounds — such as NORBIDE* boron carbide — and now provides boron as the carbide, the nitride, and as various borides.

The increasing Norton variety of boron-rich compounds, including intermediates for chemical processing and additives for metal alloying, may be the answer to one of your current production problems. Write for this new booklet, describing Norton electrochemical development of boron compounds and other raw materials. NORTON COMPANY, Electro-Chemical Division, 888 New Bond St., Worcester 6, Massachusetts.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
ELECTROCHEMICALS

GIFTS OF THE FIREBIRD: compounds of silicon zirconium • boron • aluminum • magnesium titanium • chromium . . . including many borides carbides • nitrides • oxides.

MAKING BETTER PRODUCTS
...TO MAKE
YOUR PRODUCTS BETTER

Check 1122 opposite last page

Torque Determination

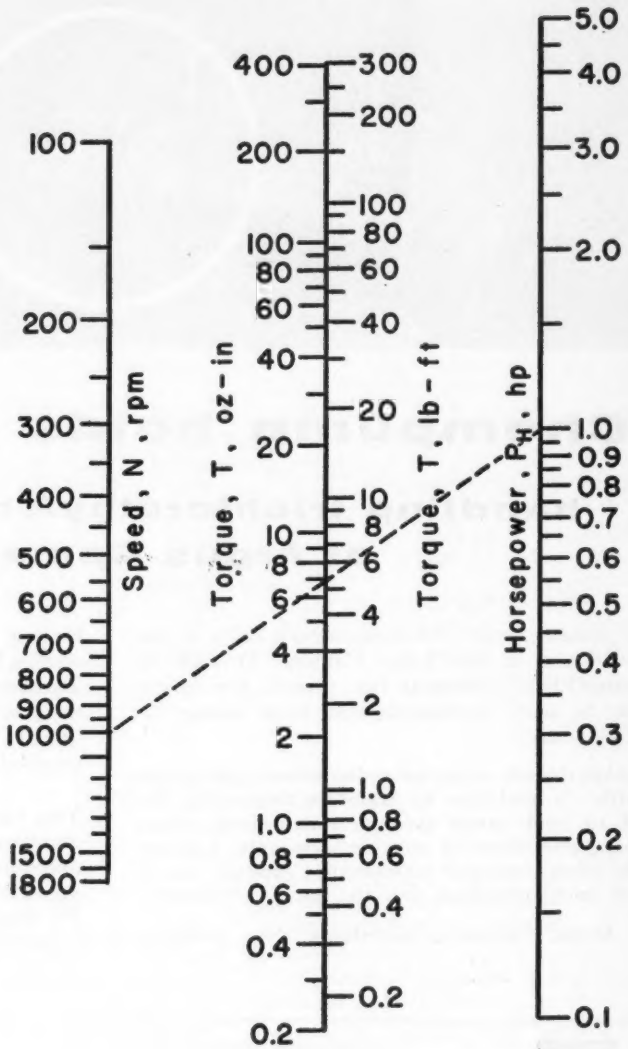
B. B. KLIMA
Chemical Technology Div.
Oak Ridge National Laboratory
Oak Ridge, Tenn.

When using dynamometers it is convenient to be able to predict the expected torque at a given rpm using a given drive.

This nomograph constructed by well-known methods[1] is convenient for accurate calculation of formula:

$$T = 5260 P_H / N$$

where T = Torque, lb-ft
P_H = Horsepower of drive
N = Speed, rpm



Typical Example

To find torque when using one-horsepower drive at rotational speed of 1000 rpm, connect 1 on P_H scale with 1000 on N scale.

Read torque of 5.3 lb-ft, or 7.0 oz-in, where line intersects T scale.

LITERATURE CITED

1) DAVIS, D. S., "Emperical Equations and Nomography," Chap V, McGraw-Hill Book Co., Inc., New York, 1943
2) MARKS, LIONEL S., "Mechanical Engineers Handbook," p 1969, 5th ed, McGraw-Hill Book Co., Inc., New York, 1951

From page 88

needle valve; modified midget glass impinger; hose connector; two one-pound containers of Du Pont "Freon" propellant (sufficient for sampling 10-14 cubic feet of air or for about eight hours operation with a 0.006" orifice); a stainless steel dial thermometer; complete calibration chart for different size orifices; and an aluminum carrying case.

To operate the air sampling device, the container of propellant is brought to environmental area temperature, temperature of the sampling area is then read, length of a sampling period required to collect a predetermined volumetric sample of air is read from chart, timer is set on the air sampling kit, and valve is opened.

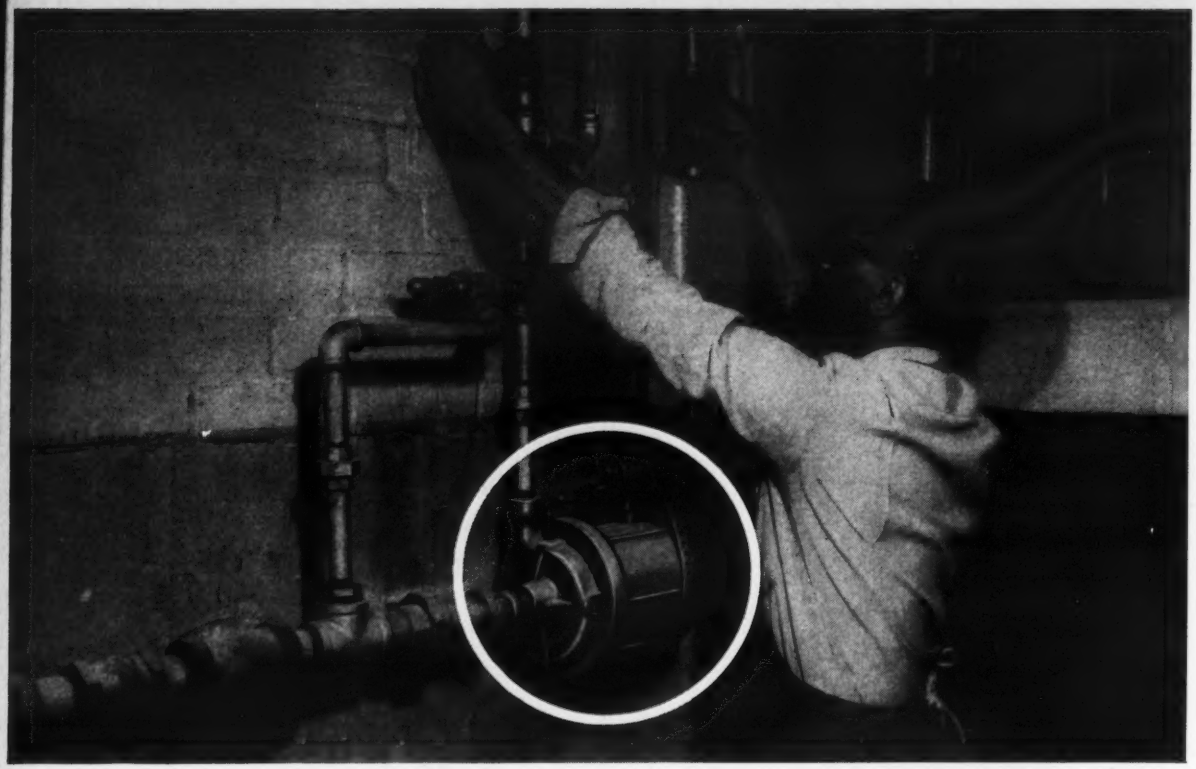
As the "Freon" expands through the venturi, it creates a vacuum which draws air through the glass impinger or sample collection tube where the contaminant being sought is absorbed in a chemical reagent solution.

Because it derives its operating power entirely from the flow of nonflammable, nonexplosive, and virtually nontoxic "Freon", and has no moving parts to generate static electricity, the jet sampler is safe for use in most atmospheres.

Lead-in-air analyzer kits are also used by technical representatives of Du Pont's Petroleum Chemicals Division as a safety device in checking the air in leaded gasoline storage tanks of refinery customers. It is expected that oil companies will use the kits for checking possible lead contamination in the atmosphere in their manufacturing operations. The equipment can be adapted for measuring other substances simply by changing the reagent solutions used in the analysis kit.

("Uni-Jet" Lead-in-Air Analyzer is available from Union Industrial Equipment Corporation, 20 Davis Ave., White Plains, N.Y.)

Check 1124 opposite last page.



Chempump holds costs down

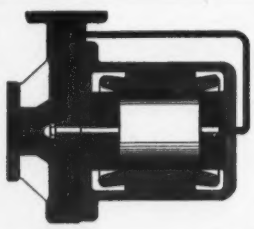
handling trichlorethylene at Argus Cameras

The explosion-proof *Chempump* shown above is one of two used at the Argus Cameras Division of Sylvania Electric Products, Inc., plant in Ann Arbor, Mich. to move trichlorethylene from storage to holding tanks.

Trichlorethylene—expensive, hazardous and highly volatile—is used here at Argus for degreasing. It's hard to hold—seeps through conventional pump packing and dissolves packing lubricants. Leakage could mean continual maintenance expense, loss of costly trichlorethylene, and the hazard of toxicity.

For Argus, *Chempump* eliminates these problems because it can't possibly leak—has no seals, no stuffing box, no packing. Simplicity of design reduces maintenance to an occasional inspection and replacement of bearings. External lubrication is never required . . . bearings are constantly lubricated by the pumped fluid itself.

You have much to gain through leakproof fluid handling with Chempump in your own processing operations. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single, leakproof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

Check 1123 opposite last page

Now available in commercial quantities, these convenient sources of fluoroalkyl groups should show speedy growth . . .

FLUOROALCOHOLS— versatile offspring of fluorochemistry

Two fluoroalcohols recently made available in commercial quantities provide a convenient means of introducing fluoroalkyl groups into an organic molecule. They should prove of particular value as intermediates for preparation of derivatives having improved thermal and chemical stability. These could include:

- thermally stable lubricants
- non-flammable hydraulic fluids
- corrosion resistant coatings
- elastomers for unusual service conditions
- specialty surface active agents
- plastics and plasticizers
- antifoaming agents

Compounds represent the lowest members of a series of trihydrofluoroalcohols containing an odd number of carbon atoms. They are prepared by the free radical telomerization of tetrafluoroethylene with methanol. Both C_3 fluoroalcohol $HCF_2 - CF_2 CH_2 OH$ (1H,1H,3H-tetrafluoro-1-propanol) and C_5 fluoroalcohol - $HCF_2 - CF_2 - CF_2 - CF_2 - CH_2OH$ (1H,1H,5H-octafluoro-1-pentanol) are supplied as technical grade products and may contain minor amounts of homologous trihydrofluoroalcohols.

Several polymeric compositions, particularly polyamides, are soluble in these fluoroalcohols although generally insoluble in other solvents. Both C_3 and C_5 are soluble in a wide range of materials including water (C_5 only partially soluble in water), ethanol, benzene, acetone, ethyl acetate, "Freon" fluorinated hydrocarbon compounds, and acetic acid.

Fluoroalcohols undergo reactions characteristic of primary alcohols. Due to inductive effect of the highly fluorinated alkyl chain, they are about 10^4 times more acidic than ethanol. It may be necessary to modify conditions generally used with hydrocarbon alcohols to carry out similar reactions.

Esters formed with unsaturated acids are of particular interest. Their polymers are plastic or elastomeric materials possessing unusually good chemical and thermal stability. Polymers of fluoroalkyl acrylates and methacrylates can be readily prepared by emulsion polymerization.

Esters of polybasic acids are of interest as high-temperature lubricants. These esters have good oxidative stability at 200°C and are stable to pyrolysis at 300°C.

Toxicological studies indicate a low order of toxicity for both C_3 and C_5 and usual precautions recommended for handling most organics should be adequate. There is a possibility that highly toxic decomposition products will be formed if fluoroalcohols or their derivatives are exposed to temperatures over 200°C. Good ventilation should be provided and due care taken in handling them at elevated temperatures.

Commercial quantities are available at $30.00/lb.

(For more information on Fluoroalcohols contact Dyes and Chemicals Div., Organic Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington 98, Del.)

Check 1125 opposite last page.

Fluoroalcohol Properties

	C_3	C_5
Form	Clear, colorless liquid	Clear, colorless liquid
Purity %	>95	>95
Hydroxyl No.	398	224
Density at 20°C, g/ml	1.4693	1.6706
Refractive index, nD^{20}	1.3218	1.3190
Acid number	0.82	0.70
Distillation range (ASTM)	90% — 99.5° to 108.5°C	90% — 133.0° to 141.0°C
Moisture content %	0.40	0.08

YOU ARE LOOKING AT ONE THING

Corrosion

CAN'T TOUCH

It is a sheet of Tygon plastic. Flexible enough you can fold it in your hand. Tough enough to outwear leather many times over. It shrugs off with equal ease — both acids and alkalies.

How is it used? In many ways. In sheet form as a protective lining for tanks containing corrosive chemicals; or as gasketing in critical sealing operations. Far more resistant to chemical attack than rubber, far easier to install, Tygon possesses the unusual property of being neutral, neither affecting nor affected by the vast majority of industrial chemicals.

As tubing—in bores ranging from 1/16″ to 3″—Tygon pipes acids, alkalies, pharmaceuticals, beverages, milk, liquid foods, blood plasma—highly critical and sensitive solutions—in perfect safety. Glass clear, flexible as a piece of string, Tygon Tubing is the standard of research laboratories the world over.

As a liquid Tygon serves both as a paint and as a dip coating. Applied by brush or spray, it protects metals and concrete from attack by acid fumes.

Tygon molds as readily as rubber, and in this form extends its protective qualities over an almost unlimited range of intricate shapes.

If corrosion is a problem to you — Tygon may prove the perfect answer.

WRITE FOR THIS FREE TYGON PORTFOLIO

Detailed technical data on the use of Tygon in its various forms, arranged in a convenient reference binder.

Address: The U. S. Stoneware Company
Plastics and Synthetics Division
Dept. CP-958
Akron 9, Ohio

Ask for the TYGON PORTFOLIO.

PRODUCT OF U.S STONEWARE

Plastics and Synthetics Division

376D-1 Tygon is a registered Trade Mark of The U. S. Stoneware Co.

Check 1126 opposite last page

CHEMICAL MATERIALS 1957-1958

Here are a few additional items introduced to industry during 1957 and the first half of 1958. These were received too late to be included in August listing.

ADECENE ALPHA OLEFINS — Unsat aliphatic hydrocarbons C_{8}-C_{20}. Lub ad, polymers, coatings. Controlled unsat. Com.

ADECENE ISOMERIZED OLEFINS — Unsat aliphatic hydrocarbons C_{10}-C_{20}. Lub ad, polymers, coatings, adhesives. Controlled unsat. Com.

ADECANE SATURATED HYDROCARBONS — High purity C_{10}-C_{20}. Specialty lub applications. Resist radiation. Dev.

OLEYL ALCOHOL — Adol 85. 80%. BP 282-349. Int drugs, detergents, stabilizers. Light color, low peroxide value.

TRILAURYL AMINE — Amine-666. 92% min. Selective complexing agent for uranium ores. Com.

(For more information on above items contact Archer-Daniels-Midland Company, Minneapolis 40, Minn.)

Check 1127 opposite last page.

SMITHOL 25 — Syn fatty oil. MP −28. Lubs, detergents, textile oils. Replaces lard, sperm oil. Heat, color stable, non-volatile. Com.

SMITHOL 30 — Poly alcohol ester of fatty acids. MP 0. Replaces natural oils in lubs, detergents, textile oils. Low pour pt, low viscosity. Dev.

(For more information on Smithol 25 and 30 contact Werner G. Smith, Inc., 1730 Train Ave., Cleveland 13, Ohio.)

Check 1128 opposite last page.

ACRYLIC POLYMER — Primer conc 911. Vehicle for metal coating primer. Resilient, adherant. Com.

FURA TONE NC-1008 — Rubber compounding resin. Low cost. Reinforcing, plasticizing action. Com.

FURA TONE NC-1012 — Impreg carbon, ceramics, metals. Low vis, high heat dist pt, chem resist. Com.

LEATHER CHEMICAL FC-146 — Fluorochemical provides oil, water repellency for leather. Com.

PENTADECYL PHENOL GLYCIDAL ETHER — Cardolite NC-513 epoxy flexibilizer. Low vis, high thermal stability. Com.

TEXTILE CHEMICALS — FC-139 (anionic), 148 (cationic), 149 (anionic), 154 (non-ionic). Fluorochemicals provide water, oil repellency for textiles. Com.

(For more information on above items contact Chemical Products Group, Minnesota Mining and Manufacturing Co., 900 Bush Ave., St. Paul 6, Minnesota.)

Check 1129 opposite last page.

Organo-mercurials prices cut

Uses: For studies of biochemical function of sulfhydryl groups; sodium salt makes an effective oral germicide.

Features: Process economies permit significant price reductions of compounds.

Description: Two compounds are available commercially: para-chloro mercury benzoic acid and sodium para-chloro mercury benzoate.

(Organo-mercurials are available from Metalsalts Corp., 200 Wagaraw Rd., Hawthorne, New Jersey.)

Check 1130 opposite last page.

Low-temp stability of two emulsifiers good at 0°F

Uses: As emulsifiers for pentachlorophenol (PCP).

Features: Formulations have good low-temperature stability at 0°F.

Description: Emcol C62-06D is especially effective for a 40% pentachlorophenol concentrate in pine oil. Typical formulation is: 40% pentachlorophenol, 45% pine oil, 15% emcol C62-06D.

Emcol C62-06C was developed for a 15% PCP concentrate in aromatic solvents. Typical formulation is: 15% pentachlorophenol, 80% sovacide 544C, 5% emcol C62-06C.

(Emcol C62-06C and C62-06D are products of Emulsol Chemical Corporation, Div. of Witco Chemical Co., 75 East Wacker Dr., Chicago 1, Ill.)

Check 1131 opposite last page.

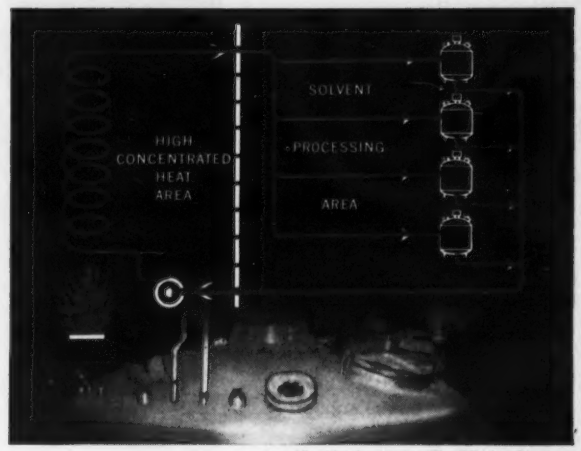
Precision heat control with non-pressurized heaters

Now, firesafe Aroclor "liquid heating" boosts solvent cooking of alkyds

Now alkyd resin makers are reaping the full advantages of solvent cooking and improvements in fusion processing to get more uniform polymer distribution, batch after batch, using Aroclor 1248 liquid-phase heat transfer!

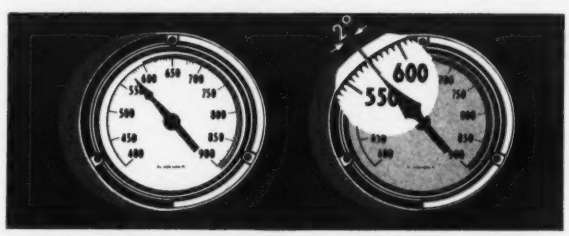
Problems in solvent cooking . . . Direct heating systems often do not give good temperature control or even heat—"hot spots" and overheating can occur easily. High concentrated heat or open flame under the cooking kettles are obvious fire hazards in solvent processes. Flammable heat-transfer fluids can be another threat to firesafety. Pressurized vapor systems are expensive.

Aroclor liquid-phase heating is firesafe and relatively inexpensive . . . Cooking temperatures are easily regulated—alkyds achieve consistently good hardness, color, drying times and other important film properties. Indirect heating with Aroclor 1248 gives sure, safe, even temperatures best for many chemical processes: dyestuff synthesis and other chemical reactions; heating bituminous materials; molding plastics and curing rubber compounds; deep-fat frying, and other food processing.

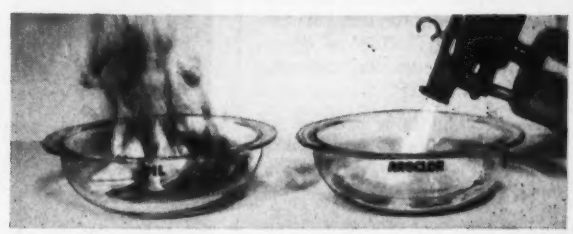


Alkyd kettle: courtesy The Glidden Company

Costs much less to install and maintain than pressurized systems—non-pressurized Aroclor liquid heating cooks alkyd resins at 400-490°F. or higher. Simple forced circulation requires no condensers, vaporizers, traps, heavy-walled jackets or complex feed mechanisms for the Aroclor heating system. Compact designs save space. Equipment ranges from small portable units—usually electrically heated—to large gas- or oil-fired units generating up to 20,000,000 BTU's per hour.



Transfers heat efficiently up to 600°F.—gives even temperatures easily controlled *to within* 2°F. Aroclor 1248 liquid is a highly stable chlorinated polyphenyl—won't pit or corrode metals—flows freely like water, above 300°F.—operates in most systems four to seven years without replacement.



A blowtorch won't ignite Aroclor 1248. Fire-resistant Aroclor increases safety—eliminates flammable heat-transfer fluids and direct firing—does not support combustion up to its boiling range, 652-725°F.—operates within a closed system vented to the atmosphere.

Aroclor: T. M. Monsanto Chemical Company

Use coupon for Aroclor engineering data—experienced sources of heating systems

Monsanto

WHERE CREATIVE CHEMISTRY WORKS WONDERS FOR YOU

Monsanto Chemical Company
Organic Chemicals Division
Department IF
St. Louis 24, Missouri

Please send: ☐ Technical information about Aroclor 1248
☐ Names of designers and manufacturers of equipment for Aroclor 1248

Name.....

Company..... *Address*.....

City..... *Zone*..... *State*.....

Check 1132 opposite last page

Vinyltoluene drying oil copolymer produces quality flat paints

Have controlled thixotropy, low odor, non-penetration

Uses: For producing high-quality flat wall paints at minimum cost.

Features: Product is a very soft thixotropic gel that can be used on conventional equipment; and with no special handling, give a final paint that has uniform thixotropy from batch to batch. Flat interior finishes have excellent non-penetrating properties. Finishes can be easily formulated in a range of 55 to 75 pvc, and with excellent color uniformity over surfaces of varying porosity.

Finishes based on this vehicle are practically free of a lingering "after-odor," which goes far to enhance customer appeal.

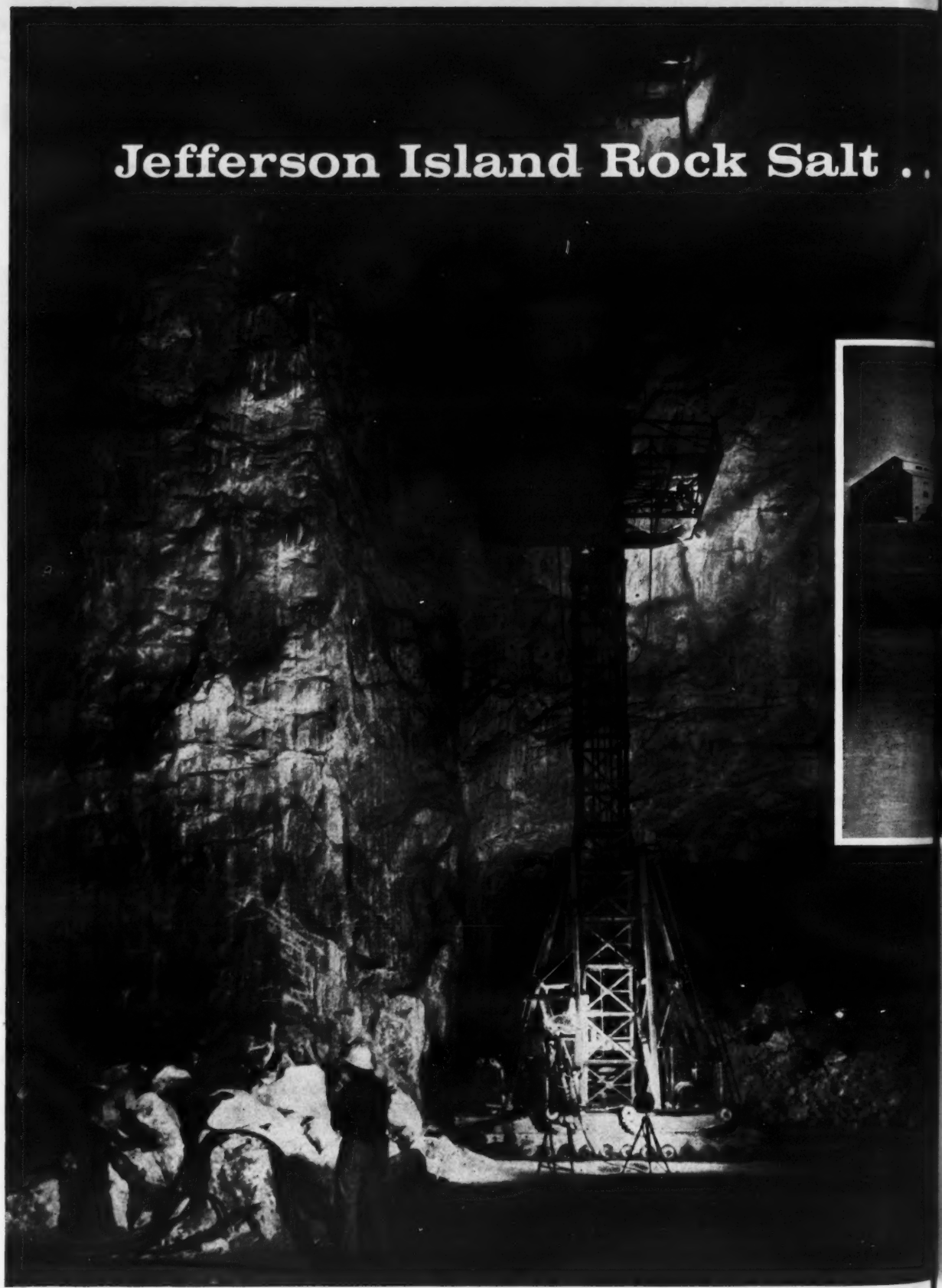
Final paints have excellent working properties with brush or roller, excellent wet edge properties with good flow and leveling, scrub resistance, and color and sheen uniformity comparable to the finest alkyd vehicles.

Description: Keltrol 1059 is a vinyltoluene drying oil copolymer, 40% solids in odorless mineral spirits. Specific gravity is 0.842.

(Keltrol 1059 is a product of Spencer Kellogg and Sons, Inc., PO Box 989, Buffalo 5, New York.)

Check 1133 opposite last page.

Jefferson Island Rock Salt ..



. . so pure that every chemical manufacturer benefits

The picture above shows rock salt being loaded into barges at Jefferson Island, La., for movement through the Inland Waterways. Many chlorine, synthetic rubber and other heavy industrial plants use barging to effect both economy and service.

For many years, rock salt from Jefferson Island has made possible many economies in chemical processing.

Mined in Louisiana from one of the world's purest deposits, this rock salt results in a consistently better end product—without the costly side reactions of impurities found in less pure salt. The big story is up to 99% purity at the source.

TWO GREAT NAMES MERGE AS ONE

Recently, the Jefferson Island Salt Co., merged with Diamond Crystal, a company known for more than 70 years as a quality producer of flake and granular salt. For example, Diamond Crystal is the leading supplier of salt to high quality food processors.

Jefferson Island Division, on the other hand, is the largest supplier of industrial rock salt by barge on the inland waterways. In fact, they pioneered the first complete ocean-going barge movement of salt to Gulf Coast chemical plants.

INHERENT PURITY—KEY TO COST SAVINGS

The inherent purity in Diamond Crystal Salt is a major factor in *all* industries.

In addition, maximum customer economies and service can result from using Diamond Crystal's complete facilities.

For immediate service and consultation on your salt problem, call the nearest Sales Office or write: Jefferson Island Salt Div., Diamond Crystal Salt Co., St. Clair, Michigan.

DIAMOND CRYSTAL SALT

SALES OFFICES: CHARLOTTE, ATLANTA, NEW ORLEANS, LOUISVILLE, BOSTON, NEW YORK, AKRON, DETROIT, CHICAGO, MINNEAPOLIS

PLANTS: AKRON, OHIO .. JEFFERSON ISLAND, LA. . . . ST. CLAIR, MICH.

Check 1134 opposite last page

Analyses available on over 1500 specialties

Analytical reports on over 1500 trade-name cleaners, cosmetic preparations, detergents, waxes, bleaches, polishes, and other industrial items are available from service, provided to all chemical specialty manufacturers as a supplement to their analytical facilities.

Reports can be obtained inexpensively on any single item or in quantity on a monthly subscription basis.

(Chemical specialties analyses are a service of Chemical Specialties Research Laboratories, PO Box 33, Ansonia, N.Y.)

Check 1135 opposite last page.

High tensile strengths offered by three silicone rubbers

Uses: Making silicone rubber compounds by molding, extrusion, or calendering.

Features: Tensile strengths of 800 to 1400 psi, tear strengths of 80 to 200 psi, and elongations of 250 to 550% are obtainable with compounds. Properly cured parts exceed appropriate tensile strength requirements of MIL-R-5847C by 23 to 54 percent.

Description: SE-482, an 80 durometer silicone rubber, is best suited for molding and calendering. It may be blended with the softer SE-452, described below, to obtain compounds of intermediate hardness.

SE-472, a 70 duro stock, and SE-452, a 50 duro stock, are especially suited for fabrication by extrusion.

SE-472, which meets the standards of AMS 3357 as well as those of MIL-R-5847C, can also be calendered.

All three may be used in extended service from −70 to 500°F. They are white compounds, but can be tinted.

(SE-452, SE-472, and SE-482 are available from Silicone Products Dept., General Electric Co., Waterford, N.Y.)

Check 1136 opposite last page.

kill foam with a Dow Corning SILICONE DEFOAMER

Is foam giving you the old "one-two"? One—slowing up your processing . . . two—running up your costs? Fight back hard. Knock out foam fast, with Dow Corning silicone defoamers . . . most efficient foam killers known!

1 oz kills foam in:

3,125,000 lb cellulose slurry

62,500 lb hypo fix and film developer

6,250 lb acetic acid-wood alcohol distillation mix

FREE SAMPLE! Make your own test. Return coupon below for generous *trial sample* of a Dow Corning SILICONE DEFOAMER. No obligation, of course.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

329

NAME

TITLE

COMPANY

CITY ZONE STATE

My foamer is

Oil system

Aqueous system

Food products

Other

Check 1137 opposite last page

Although material is composed of fine particles, only a minimum of dusting occurs during use

Naphthalene sulfonic acid condensate — valuable as a dispersant and stabilizer in the paper industry and useful for other applications — now available as —

Tiny, uniform beads that dissolve readily

Made possible by spray dryer placed in service May 15. Improved material dusts less than similar products, is light in color, and has nearly neutral pH

Uses: Main application is in paper mills to prevent the deposition of pitch particles in systems using sulfite, semi-chemical, or groundwood pulps. When product is added dry to beater or chests, pitch suspensions are kept evenly distributed without agglomeration. Consequently, sheet surfaces are free of pitch spots, felt life is prolonged, and equipment is cleaner.

Among other applications in the paper industry, material is used to stabilize rosin size against premature coagulation and acts as a mordant for basic dyestuffs. It also helps control growth of slime flora and enhances flow properties of stiff paper coatings.

In tanning industry, product speeds processes and makes them more effective. It has a

To page 99

THAT'S INTERESTING

'Fabelling'

Distinctive designs and marks on brick and pottery date back to 6000 BC. According to one source, the printed label first appeared in the 18th century. John Wanamaker introduced gummed advertising labels; Einar Hoelbell, a Danish postal clerk, devised Christmas seals; B. T. Babbitt, a soap manufacturer, started the business of giving out premiums for soap wrappers sent in by the consumer. (*Industrial Bulletin,* Arthur D. Little, Inc.)

Blending mixup

In reporting a custom blending press conference, a Louisville, Ky., paper insisted on calling a new pump a "mixing" pump instead of a "blending" pump. When asked why, the editor replied, "Suh, in these parts we may mix 'em, but we never blend 'em . . ." (*Our Sun,* Sun Oil Company)

For more information on product at right, specify 1138 see information request blank opposite last page.

TRIMETHYLOLPROPANE . . . a fast 10,000,000 lbs. to feed growing industry

The properties of this free-flowing polyol are of prime importance to the fast-growing polyurethane foams industry. Trimethylolpropane's ability to improve both rigid and flexible foams, coupled with its easier processing, offer extremely valuable manufacturing advantages. And in the large alkyd resins industry serving the $1.6 billion paint market, this chemical intermediate is also finding important application.

But, until Celanese developed a method for high-volume, low-cost production, the usefulness of trimethylolpropane was severely limited. Today, a major Celanese production facility at Bishop, Texas, is geared to turn out in excess of 10 million pounds, providing industry with a high quality product at a practical price.

This is another example of how Celanese development and production anticipate and meet the needs of progressing industries.

Celanese®

Basic reasons . . . . . for improved products

Acids	Functional Fluids	Polyols
Alcohols	Gasoline Additives	Plasticizers
Aldehydes	Glycols	Salts
Anhydrides	Ketones	Solvents
Esters	Oxides	Vinyl Monomers

Celanese CHEMICALS

Agricultural	Paper
Automotive	Pharmaceutical
Aviation	Plastics
Building	Surface Coatings
Electrical	Textiles

CELANESE CORPORATION OF AMERICA, CHEMICAL DIVISION, DEPT. 591-S, 180 MADISON AVE., NEW YORK 16.
EXPORT SALES: AMCEL CO., INC., AND PAN AMCEL CO., INC., 180 MADISON AVE., NEW YORK 16.

NEW from Standard Oil

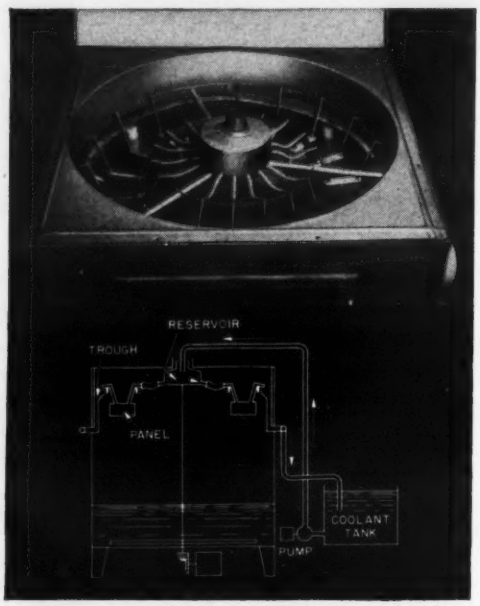
THE MAGIC BOX

Corrosion steals $5.5 billion from industry annually. Standard Oil is in the forefront of the fight to control this loss. Standard's research scientists have developed a new method for measuring the effectiveness of rust preventives. This new test takes less than one-twentieth of the time of previous tests—and is about three times as precise.

Using a controlled humidity cabinet for testing corrosion, these Standard research men installed a system for cooling metal test panels (previously treated with rust preventive) so that their surface temperatures are lower than the temperature in the cabinet. Temperatures of panel surfaces and of cabinet atmosphere are held accurately. Controlling the temperature of the panels controls the rate at which water condenses on them. This in turn (for the first time) permits accurate control of the amount of condensation on the panels. Rust preventives are more speedily and precisely tested. Science, as a result of this work, has a new tool with which to test corrosion.

This is the research pay-out industry receives from Standard Oil. This is the something extra that backs up the Standard industrial lubrication specialist who calls on you. This is the something extra found in the products he sells.

To know more about how Standard Oil industrial lubrication specialists—and Standard's research program—can help you, call the Standard Oil office nearest you in any of the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.**



Top view and cross section of Accelerated Condensation Corrosion Test cabinet.

You expect more from STANDARD and get it!

Edgar A. Dieman, Standard Oil scientist, inventor of new Rust Preventive System, inspects metal panel that has undergone test in the humidity cabinet.

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *welcome* your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 7.)

Address your comments to: The Editor CHEMICAL PROCESSING 111 E. Delaware Place, Chicago 11, Illinois

For more information on product at left, specify 1139 see information request blank opposite last page.

From page 96

dispersing and solubilizing action on grease particles, insoluble tannins, pigments, clays, and fillers. For this reason, material promotes fast, deep penetration required for astringent tanning and retanning solutions, vegetable extracts, dyes, and fat liquors.

Product can also be applied as a suspension agent for latex paints, dispersant for powdered paints, and viscosity reducer for pigment slurries.

Features: Spray dryer placed in service in expanded plant at Cedartown, Georgia, on May 15, 1958, helps to improve the quality of the material. After spray drying, product is in the form of tiny, uniform beads, with good color and clear solubility in hard or soft water. Material dusts less and has a pH closer to neutral than do similar products.

Description: Nopcosant is the neutral sodium salt of a condensed naphthalene sulfonate. It consists of fine, light tan particles. Moisture content is 5.0% maximum, and pH of a 2.0% solution is 7.5-8.0.

(Nopcosant is product of Nopco Chemical Company, Inc., Harrison, N.J.)

Check 1140 opposite last page.

Aluminum ingots assay 99.99% purity

Uses: Applications include petroleum catalysts for producing high-octane gasoline, electrical capacitor foil, and decorative applications for consumer products.

Features: Product is now available to industry in ingot form.

Description: Aluminum ingot of 99.99 percent purity may be obtained in 6-, 15-, 30-, and 50-pound sizes. It is being produced in refining cell facilities at company's Mead, Washington, reduction plant.

(Aluminum ingots are available from Kaiser Aluminum & Chemical Sales, Inc., 919 North Michigan Ave., Chicago 11, Illinois.)

Check 1141 opposite last page.

CO_2 the most economical inert gas

Carbon dioxide is a truly versatile chemical: a solid or liquid refrigerant... a pressure-producing and carbonating agent... a chemical that reacts with a select number of substances... and, in apparent contradiction to its chemical uses, a low-cost inert gas with a wide range of applications, many of which have hardly been exploited.

These inerting applications, in fact, may well eventually overshadow the generally accepted ones. Although CO_2 cannot be used in *all* inert gas applications, it can be used in many cases just as effectively as the more costly and less easily handled "elemental" inerts: argon, nitrogen, etc.

For example, here are just a few CO_2 inerting uses:

Blanketing explosives and combustibles... solvent dewaxers... alkyd resins (while also providing sufficient pressure for agitation)... within vessels to eliminate oxidation, skinning or bacterial growth from such materials as paints, varnishes, tall oils, etc.

Purging vessels prior to filling with special materials... lines, holders, tanks, etc., while under storage or being emptied... hydrogen-filled generators during repairs... gasoline and oil tanks, etc., under repairs.

Pressure transference of combustibles of all types without pumps.

Shielding welding arcs.

Reducing fire and explosion hazards while materials undergo grinding and pulverizing. CO_2 also reduces temperature of materials prone to soften during these operations.

Mathieson CO_2 comes in a variety of forms and quantities ranging from 50-lb. cylinders and dry ice to 24- and 30-ton tank cars for direct unloading to your process. Why not contact an Olin Mathieson representative soon for an informative discussion that may open new or more economical uses for this safe, tested product.

HERE ARE SOME OF THE IMPORTANT CHARACTERISTICS OF CO_2 VAPOR

Molecular weight	44.004
Specific Gravity	1.527 (when air equals 1) 1.557 (when N_2 equals 1)
Absolute density	0.114 lb/cu. ft. @ 70° F.
Thermal conductivity	0.590 (air equals 1)
Specific heat	0.19 to 0.21 BTU/lb
Volume, cu. ft./lb	8.79 @ 70° F.
Pressure, saturated	852.5 psia @ 70° F.
Cost, 100 cu. ft.	$0.455 ($CO_2$ costing $.04/lb)

5628

MATHIESON CHEMICALS

OLIN MATHIESON CHEMICAL CORPORATION

INDUSTRIAL CHEMICALS BALTIMORE 3, MD.

Check 1142 opposite last page

Continuous Column System with Pittsburgh Granular Activated Carbons

1. Greater capacity, lower carbon dosage, lower cost
2. Higher product quality, better colors, higher purity
3. A clean, continuous operation—no intermediate handling
4. Less equipment—less maintenance required

Mr. Processing Engineer:

Which Adsorption System Would You Recommend?

Batch Type Operation with Powdered Carbons

1. Low efficiency—high carbon dosage—high labor cost
2. Requires slurrying and filtering, with filter cake retention loss
3. Creates dusting problems and high maintenance costs

Want More Information? Send for this Booklet

There's a type of Pittsburgh Granular Carbon ideally suited to solve your particular adsorption problem. Write for folder describing Pittsburgh Activated Carbons in both liquid and vapor phase applications . . . it's free.

PITTSBURGH COKE & CHEMICAL CO.

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Check 1143 opposite last page

CHEMICAL MATERIALS

Hexachlorophene data

A supplemental bibliography on G-11® (Hexachlorophene U.S.P.) abstracts of 20 articles and 4 patents. Tech Bul H-1 — Sindar Corp., 321 W. 44th St., New York 36, N.Y.

Check 1144 opposite last page.

Guarantee 99.995% purity of argon as delivered

Gas becoming important as He supply dwindles

Uses: For production of titanium, zirconium, yttrium, and other rare earth metals; as an inert atmosphere for honeycomb panels and for both the Heliarc and Sigma electric welding processes; and as a growing atmosphere for semi-conductor crystals of germanium and silicon.

Features: High purity of 99.995% is guaranteed for delivery state of compressed argon gas. Argon delivered in liquid form is even purer — 99.999%. Liquid argon averages less than 25 parts per million of impurities and contains practically no moisture.

Description: This high purity gas is manufacturer's regular industrial argon — available for all orders without any special price or grade category.

Argon will probably assume a heavier workload in the future due to the shortage of helium.

(High purity argon is available from Linde Company, Div. of Union Carbide Corp., 420 Lexington Ave., New York 17, N.Y.)

Check 1145 opposite last page.

NEXT MONTH

Molecular sieves hold promise of solving many processing problems. One successfully handled already, incorporating a volatile catalyst in silicone rubber, helped Stowe-Woodward develop a coated roll for plastics processors. Details will be given in the October issue.

Acetylene homolog as specialty fuel, and intermediate

Uses: As a specialty fuel and as an intermediate in synthetic rubber, textiles, agricultural herbicides, pharmaceuticals, and plastics.

Features: Application of product as an intermediate for methacrylonitrile, methacrylates, and propargyl alcohol appears to be a definite possibility. Because of its thermodynamic characteristics, product shows promises as a specialty fuel in applications where controlled decomposition, low critical compression, and low ignition energy are required. Use as a monopropellant fuel may also be feasible.

Description: Methylacetylene-propadiene is a non-corrosive liquefied petroleum gas; a mixture of methylacetylene (about 70% by weight) and its isomer, propadiene (about 30% by weight). It undergoes numerous reactions similar to those of its homolog, acetylene.

In numerous cases, methylacetylene-propadiene reacts in a manner similar to that of its corresponding alkene, propylene. However, it has more affinity for nucleophilic fragments (alcohols, amines, water, etc.) and offers the possibility of two-mole addition products. The tankcar price is 23 cents/lb.

(Methylacetylene-propadiene is available from the Dow Chemical Co., Midland, Mich.)

Check 1146 opposite last page.

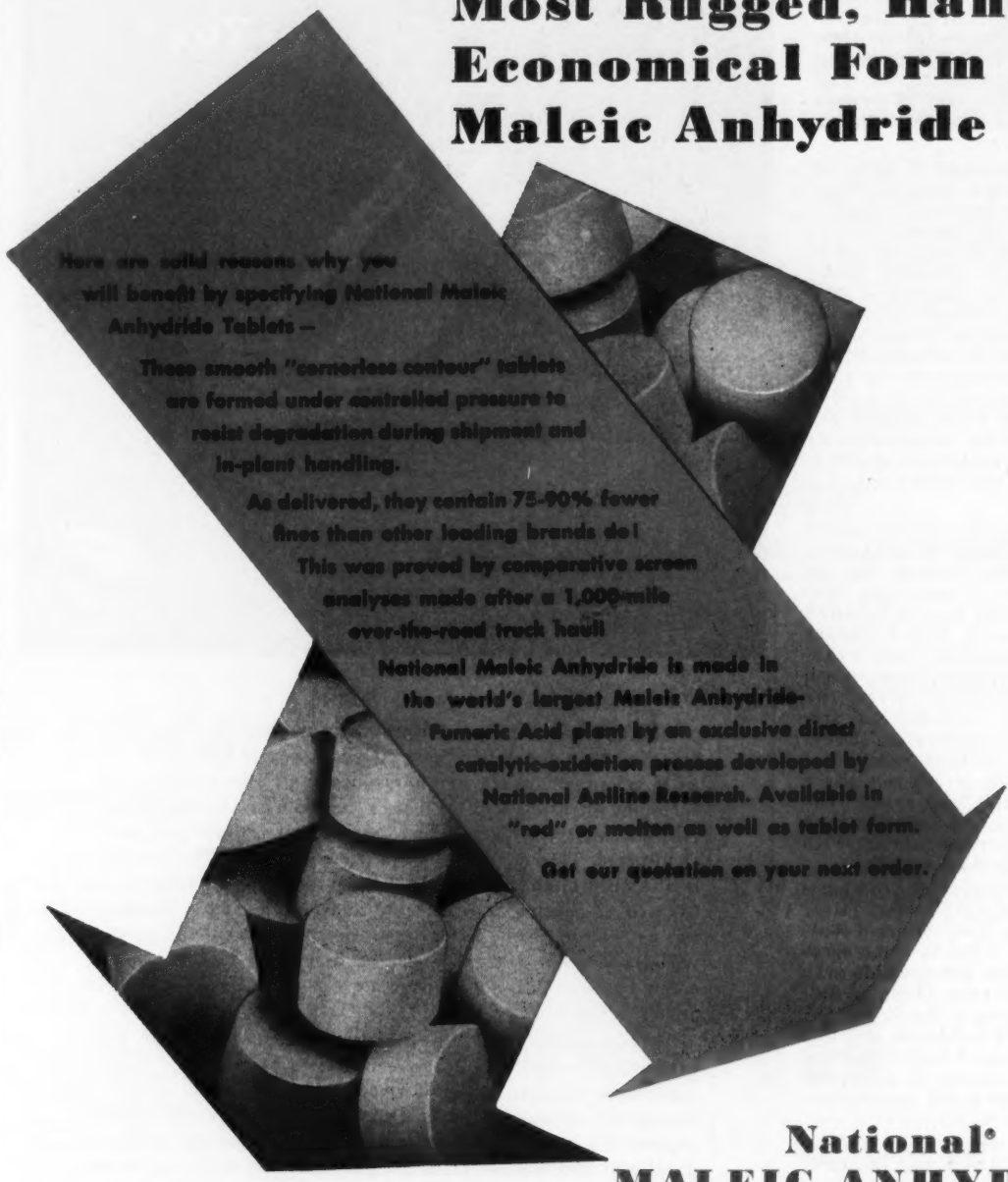
Synthetic detergent data

Bound reprint of 78 pages contains summary of synthetic detergent field and its most recent developments. Listed alphabetically are over 2000 U.S. trade name products, together with manufacturer, class and formula, main use, form, percent concentration, type, and further remarks. To obtain "Surfactants Listed", remit $2.50 direct to John W. McCutcheon, Inc., 475 Fifth Ave., New York 17, New York.

Originated by Resin-Chemical Headquarters

and still the

Most Rugged, Handy, Economical Form of Maleic Anhydride


Here are solid reasons why you will benefit by specifying National Maleic Anhydride Tablets —
These smooth "cornerless contour" tablets are formed under controlled pressure to resist degradation during shipment and in-plant handling.
As delivered, they contain 75-90% fewer fines than other leading brands do! This was proved by comparative screen analyses made after a 1,000-mile over-the-road truck haul!
National Maleic Anhydride is made in the world's largest Maleic Anhydride-Fumaric Acid plant by an exclusive direct catalytic-oxidation process developed by National Aniline Research. Available in "rod" or molten as well as tablet form.
Get our quotation on your next order.

National® MALEIC ANHYDRIDE Tablets

Allied Chemical

NATIONAL ANILINE DIVISION
40 RECTOR STREET, NEW YORK 6, N. Y.
Akron Atlanta Boston Charlotte Chattanooga Chicago Greensboro Los Angeles
New Orleans Philadelphia Portland, Ore. Providence San Francisco Toronto

Check 1147 opposite last page

SHEDDING NEW LIGHT ON PRECOAT FILTRATION PROBLEMS

It is generally known in engineering circles that the theory of filtration has not yet reached the point where flow rates and the degree of clarification can be predicted accurately. Plants using supposedly identical systems to filter raw sugar liquors, antibiotic fermentation brews, varnishes, or whatever, will experience extremely wide divergences in filtration rates.

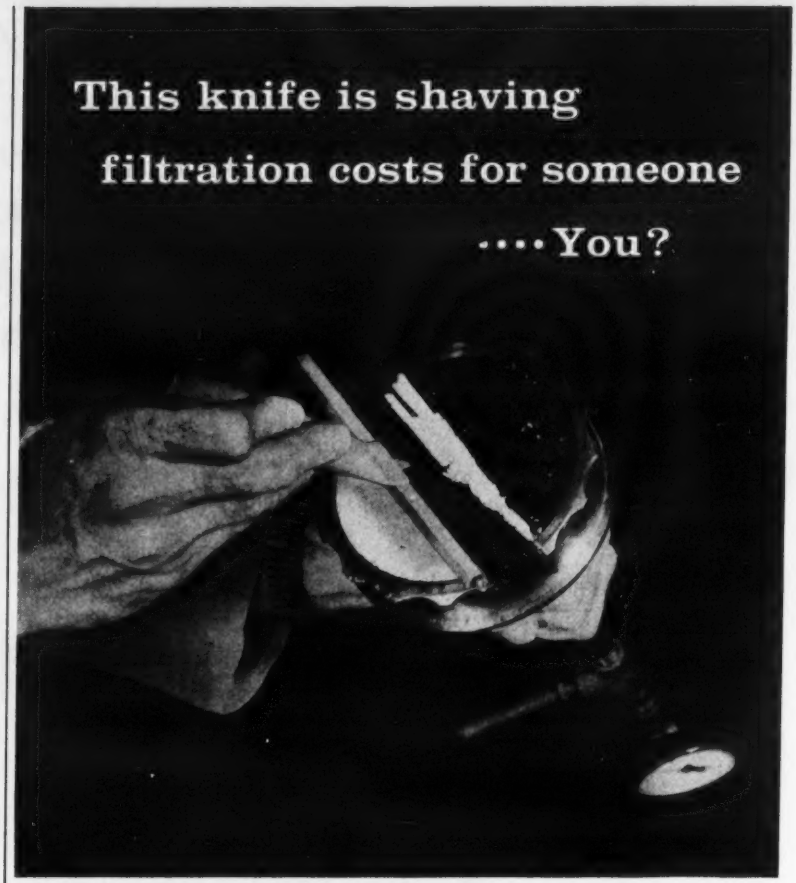
Accurate determinations of filtration costs and the sizing of equipment can thus be made only by actual filtration tests. While the well-known Dicalite Bomb Filter has provided a means of investigating batch pressure filtration operations, no comparable test device has been available to industries using or planning to use rotary vacuum (or pressure) precoat filters. Consequently, the necessity for time consuming and expensive pilot plant testing of precoat filter systems has seriously impeded the introduction of this labor-saving equipment where it offered potential cost reductions.

Now, after several years of laboratory development and field testing, we are proud to announce that Dicalite has developed a precise and accurate Precoat Test Leaf, available for general use, which allows study of all the process variables of precoat filtration in the laboratory. Drum speed, grade of filteraid, amount of filteraid and depth of cut can all be checked out rapidly and easily. The results obtained, and predictions based thereon, correlate closely with actual plant production results.

Our own tests and field experience indicate that many precoat filter operators can cut their filteraid costs by at least 20% – and in some cases savings up to 50% are possible even in "blue chip" concerns. These savings result either from a change in the grade of filteraid employed, or from adjustments in one or more operating factors which could not be accurately checked in large-scale production units.

If you have a potential precoat filtration application, or if you presently operate a precoat filter and want a quick test of the possibility of cutting operating costs, we suggest that you get in touch with your Dicalite sales engineer. We are not in the business of selling test units, but we will be glad to run tests for you, or to assist you in obtaining a Dicalite Precoat Test Leaf for your own use.

P. W. Leppla, Technical Director



Here, a problem in rotary vacuum precoat filtration is being worked out with a new laboratory-scale testing device. And, when the tests are completed, *all* the answers for optimum filtration will be there ... maximum through-put at desired clarity, with the most economical dosage and grade of filteraid. This new test leaf, a product of Dicalite research, is the only such device which provides the all-important feature of precise and accurate shave-off control. Hence, it can determine, in the laboratory, the effects of all the process variables – with only a few gallons of process liquor – in just a few hours – with an accuracy never before possible even in pilot plant tests.

Tests made with this Dicalite Precoat Test Leaf have already effected filtration economies for many Dicalite customers, coast to coast. If you would like further information on this device, we will be glad to send you an illustrated reprint of a paper read before an A.I.Ch.E. meeting and later published in a leading chemical journal. Just write us, or ask your local Dicalite sales engineer.

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

Among the DIATOMS shown here:
SYNEDRA
NAVICULA
CYMBELLA
SURIRELLA
COSCINODISCUS
ACTINOPTYCHUS
EPITHEMIA
EUNOTIA

Dicalite Department, Great Lakes Carbon Corporation
612 South Flower Street, Los Angeles 17, California

Check 1148 opposite last page

CHEMICAL MATERIALS

Fast, low-cost delivery of 99.5% HCl

Manufacturer is making available commercial quantities of anhydrous hydrogen chloride (HCl).

Produced in 99.5% concentration, this important industrial chemical component is used in the manufacture of alkyl chlorides, vinyl chlorides, camphor, rubber hydrochloride and related products, alkylated detergents, certain drugs, in isomerization units of oil refineries, cotton delinting, and certain metallic chlorinations.

(HCl is available from Frontier Chemical Co., Div. of Vulcan Materials Co., Municipal Airport Terminal Bldg., PO Box 545, Wichita 1, Kan.)

Check 1149 opposite last page.

Teflon can be bonded for high-temp uses with adhesive

Bonds hold full strength even at 500°F

Uses: Bonding Teflon for tank linings and other applications even at elevated temperatures.

Features: Adhesive will bond Teflon at temperatures as high as can be withstood by Teflon itself. Bond strength is equal to or greater than bond of Teflon to sodium-etched surface even at 500°F.

Description: Two-container, epoxy-based adhesive provides a usable pot life in excess of 16 hr. If held under refrigeration, pot life is over six months. If surface is not corroded, a thorough solvent wash, or light sanding provides satisfactory surface preparation.

Adhesive can be spread directly on sodium-etched Teflon with no further surface treatment. Cure time under contact pressure; @ 250°F—4 hr; @ 450°F—½ hr.

(Epoxylite 5403 high-temperature adhesive is a product of Epoxylite Corporation, 10829 E. Central Ave., El Monte, Calif.)

Check 1150 opposite last page.

Plasticizer Properties

Epoxidized Esters	1,2-propylene glycol dioleate	Pentaerythritol tetraester of tall oil fatty acid	Octyl oleate (Celluflex 21)	Octyl ester of tall oil fatty acid (Celluflex 23)
Oxirane Oxygen wt %	4.6	5.4	3.5	4.4
Sp Gr, 25/25°C	0.946	1.004	0.901	0.918
Vis, cps, 25°C	80	708	21	26
Pour Point, °F	20	−20	10	−5
Volatility act. carbon, 24 hr at 70°C, % loss	0.7	0.7	1.2	1.0
PVC plasticized with epoxy esters				
Low temp performance, Clash & Berg T_f value, °C	−33	−8	−53	−43
Soapy water extraction, 24 hr at 70°C, % loss	1.0	0.3	4.6	7.0
Oil extraction (USP mineral oil), 24 hr at 70°C, % loss	13	3.5	19	16

Based on epoxidized esters of tall oil or oleic acid —

plasticizers for PVC offer all-round advantages

Products are good at low temperature, furnish color stability, resist extraction, and have low volatility

Currently under investigation — may be commercially available soon — is an epoxidized plasticizer expected to be valuable for use in polyvinyl chloride. Although the exact composition of this product cannot be disclosed at this time, it can be revealed that tall oil fatty acids will be an important raw material. Product will probably be related to epoxidized esters of glycols or pentaerythritol, which were recently disclosed (at the ACS epoxy plasticizer symposium held in New York last September) as having interesting properties.

Since the epoxide group is an efficient scavenger for hydrogen chloride, epoxidized esters contribute greatly to improved color stability of polyvinyl chloride plastics. They are also very effective plasticizers.

In addition to this new product to be offered commercially, an epoxidized pentaerythritol ester of tall oil fatty acids may be offered in development quantities. Epoxidized octyl oleate (Celluflex 21) and epoxidized octyl ester of tall oil fatty acids (Cellu-

bacteriostatic, fungistatic and surface-active agents; polymer components—

THE ALKYL BORIC ACIDS

3

Two new organoboron compounds—Nonyl Boric Acid, $C_9H_{19}B(OH)_2$; and Dodecyl Boric Acid, $C_{12}H_{25}B(OH)_2$—are available in developmental quantities. They are very weakly acidic, oxidize about as readily as aldehydes, and are stable to hydrolysis.

Tests show interesting bacteriostatic, fungistatic, and surface-active properties. Usefulness is indicated in products requiring resistance to rot and fungal attack. Some patented uses are: as organic-inorganic polymer intermediates, as petroleum additives, and as stabilizers for aromatic amines. Write for Bulletin C-710.

Phone: FOrest 4-1130 TWX: Perryville, Pa. 117

GALLERY CHEMICAL COMPANY
PITTSBURGH 37, PENNSYLVANIA

Check 1151 opposite last page

Developing a new household product?

*Give it a selling fragrance with ODRENES**

Right now—at the development stage—is the time to plan the odor of your household product.

And you'll save time, trouble and expense if you use an ODRENE. ODRENES are a series of fragrances scientifically compounded to solve the odor problems of household products. They are easy and economical to use—and available in a wide range of consumer-tested odor types. Each type is extremely versatile—readily adaptable to the special requirements of the product in which it is to be used.

Samples of ODRENES are available on request. And our technical staff—pioneer in the field of aromatics—offers you full cooperation in their use.

**Odrene is the registered trade-mark for Sindar's series of fragrant additives.*

SINDAR® Corporation
Industrial Aromatics and Chemicals
321 West 44th Street • New York 36, N. Y.

Check 1152 opposite last page

LACTIC CASEIN

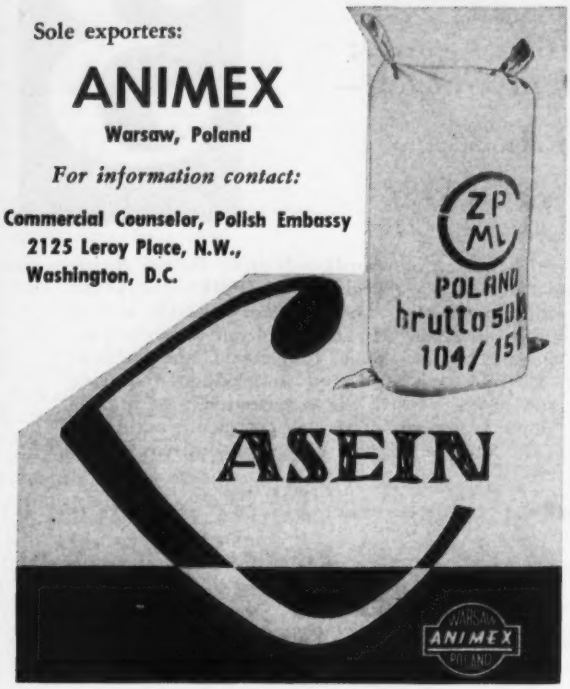
Granulation:
30, 60 and 90 mesh

Sole exporters:

ANIMEX
Warsaw, Poland

For information contact:

Commercial Counselor, Polish Embassy
2125 Leroy Place, N.W.,
Washington, D.C.



Check 1153 opposite last page

HOW OXY-CATALYST SYSTEMS STOP INDUSTRIAL AIR POLLUTION— RECOVER WASTE HEAT

New brochure gives facts and figures on typical installations— send for your free copy now!

Oxy-Catalyst Systems for air pollution control and waste heat recovery are one of the most important and most effective solutions to these problems ever developed. Engineered to your individual requirements, they can clean up close to 100% of combustible pollutants and odors. They can also recover the waste heat in process exhaust gases; and they can often do both at once.

This new brochure tells how Oxy-Catalyst installations have stopped air pollution—often at an actual saving—in a wide range of industries. If air pollution is a problem in *your* operations, write for your free copy now.

OXY-CATALYST, INC. WAYNE 7, PA., U.S.A.
Catalysts for fume and odor elimination, air pollution control, and waste heat recovery

Please send me your new brochure on Oxy-Catalyst Systems for air pollution control and waste heat recovery.

Name_____
Firm_____
Street_____
City_____ Zone_____ State_____

Check 1154 opposite last page

flex 23) are presently available in commercial quantities.

Epoxidized esters of tall oil are not new. USDA and Becco have reported materials of this type. David Swern of USDA has done considerable pioneering work in this area. However, comparatively little attention has been paid to the usefulness of epoxidized esters of polyols other than glycerine.

Properties of plasticizers presently available (Celluflex 21 and Celluflex 23) and those which have been disclosed are shown in the accompanying table. The epoxidized pentaerythritol ester is particularly outstanding because of its high permanence as shown by resistance to soapy water and oil extraction and to volatile loss. Migration resistance is also high.

(Celluflex 21, Celluflex 23, and other epoxidized plasticizers are products of Celanese Corporation of America, 180 Madison Avenue, New York 16, New York.)

Check 1155 opposite last page.

(For further information on tall oil check 1156 opposite last page.)

Fast-fusing plasticizer offers good heat, light stability

Low-temperature flexibility equal to dioctyl phthalate

Uses: As primary plasticizer for polyvinyl chloride.

Features: Plasticizer offers good heat and light stability. Low-temperature flexibility is equal to that of dioctyl phthalate.

Description: Product is low-cost, fast-fusing, primary plasticizer for polyvinyl chloride. The chemically blended mixed-alcohol phthalate is practically water-white, and offers good general-purpose properties.

(Santicizer 165 is available from Organic Chemicals Division, Monsanto Chemical Co., St. Louis 24, Mo.)

Check 1157 opposite last page.

"NOSEY" says:

STRANGE, but true, it's the food and beverage industry that presents FRITZSCHE its most baffling odor problems. . . . Like the coffee merchant's need for a precise aromatic simulation of his particular coffee blend . . . or that of a well known distillery for an alcoholic beverage aroma for sales promotion purposes . . . and the numerous requests by bakery firms and their advertising agencies for cake, bread and baked goods odors to be applied to package wrappers and for point-of-sale merchandising . . . also honey and fruit aromas for various applications. All difficult, but it is these hard-to-solve odor problems on which FRITZSCHE'S Odorant Division thrives. That's why they're head 'n shoulders high in this unique and most important field!

FRITZSCHE Brothers, Inc. Est. 1871

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cincinnati, Ohio, Greensboro, N. C., *Los Angeles, Cal., Philadelphia, Pa., San Francisco, Cal., St. Louis, Mo., Montreal and *Toronto, Canada; *Mexico, D. F. and *Buenos Aires, Argentina. FACTORIES: *Clifton, N. J. and Buenos Aires, Argentina.*

Check 1158 opposite last page

The Smart Trend in

PVA EXTENDERS!

Tamms GOLD BOND R SILICA

A functional extender pigment especially adapted to PVA formulation for scrubability, leveling and flat sheen. It is easily wetted and dispersable. pH of 6.5—6.8. Non-crystalline structure. Economical in cost.

TAMMS INDUSTRIES CO.
RM 70 228 N. LA SALLE ST., CHICAGO 1, ILL.

Check 1159 opposite last page

Stable radioisotope tritiated cytidine has high activity

Uses: Cellular research. Ideally suited for critical experiments on RNA formation.

Features: Radiochemically pure in sterile aqueous solution. Specific activity is 360 mc/mM.

Description: Tritiated cytidine is a stable radioisotope with a half-life of 12½ yr. It provides high resolution in radioautographs. No AEC license is required. Cost on a 250μc vial is $30.

(Tritiated cytidine is available from Schwarz Laboratories, Inc., 230 Washington St., Mount Vernon, N.Y.)

Check 1160 opposite last page.

Provides good gloss, speedy baking in enamels

Uses: Product is designed for baking enamels.

Features: Very fast curing speed and maximum gloss are obtained. Good mar resistance and superior color and color retention, even at high baking schedules, are reported. Product is resistant to alkali and soap, and has outstanding adhesion.

Description: Melamine formaldehyde resin can be used in a number of different types of baking coatings. The nonoxidizing short oil types give enamels with better color retention in high-temperature bakes or in high-temperature service. Oxidizing alkyds add toughness and adhesion with some sacrifice in color retention.

(Uformite MM-57 is available from Resinous Products Div., Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.)

Check 1161 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

The new Poly-Tergent J's (J-200, J-300, J-400, J-500) are nonionic surface active agents. They are pale yellow, have a slightly aromatic odor, and are offered as 85% aqueous solutions. They are used chiefly as detergents, dispersants, emulsifiers and wetting agents. Being aliphatic polyoxyethylene ether alcohols, they are chemically stable and highly effective under a wide range of acid or alkaline conditions.

Production is at Olin Mathieson's modern organic chemicals plant in Brandenburg, Kentucky. Local stock points are situated in key industrial cities. Poly-Tergent J surfactants are shipped in tank cars, tank trucks and 55-gallon drums. For processing economies in your operations, write today for samples.

Polyamines
Ethanolamines
Ethylene Oxide
Ethylene Glycol
Ethylene Diamine
Diethylene Glycol
Triethylene Glycol
Dichloroethylether
Ethylene Dichloride
Surfactants (Poly-Tergents)
Polyethylene Glycols (Poly-G's)
Glycol Ether Solvents (Poly-Solv's)

Poly-G, Poly-Solv and Poly-Tergent are registered trademarks

for chemical stability...

Poly-Tergent J surfactants

ORGANIC CHEMICALS

OLIN MATHIESON CHEMICAL CORPORATION
ONE PARK AVENUE, NEW YORK 16, NEW YORK

5635

Check 1162 opposite last page

SAVINGS FOR *YOU* *AND* YOUR COMPANY

no maintenance with the *first* fully self-contained *mechanical pilot* operated steam pressure reducing valve

THE ALL NEW LESLIE-TOPPER assures you reliable, year 'round control in continuous, intermittent or stand-by service. Check these features available in *no* other valve.

- PACKLESS • METAL DIAPHRAGM • STELLITED STAINLESS STEEL SEAT RING
- SINGLE SEATED • STAINLESS STEEL MAIN VALVE HARDENED TO 500 BRINELL
- INLET PRESSURES: 7-250 PSI • REDUCED PRESSURE RANGES FROM 2-35 PSI

If this valve doesn't give 100% satisfaction and prove to be better in every way than any valve you have ever used in this service your money will be refunded in full.

Order from your local Leslie distributor now and eliminate reducing valve headaches during the coming *heating* season.

LESLIE

REGULATORS and CONTROLLERS

LESLIE CO., 281 Grant Avenue, Lyndhurst, New Jersey

Check 1163 opposite last page

INSTRUMENTATION FEATURE SECTION HIGHLIGHTS

Group understanding is necessary if instrumentation of a new process isn't to be obsolete by the time it's completed . . . . . facing page

Savings pay for automatic control system within 30 days at major synthetic-rubber plant 112

Traveling thermocouples assure close control of naphthalene oxidation process 117

Infrared spectrophotometer analyzes tranquilizer drug on production basis 124

Efficiency of process gas chromatography can be increased with two instruments 132

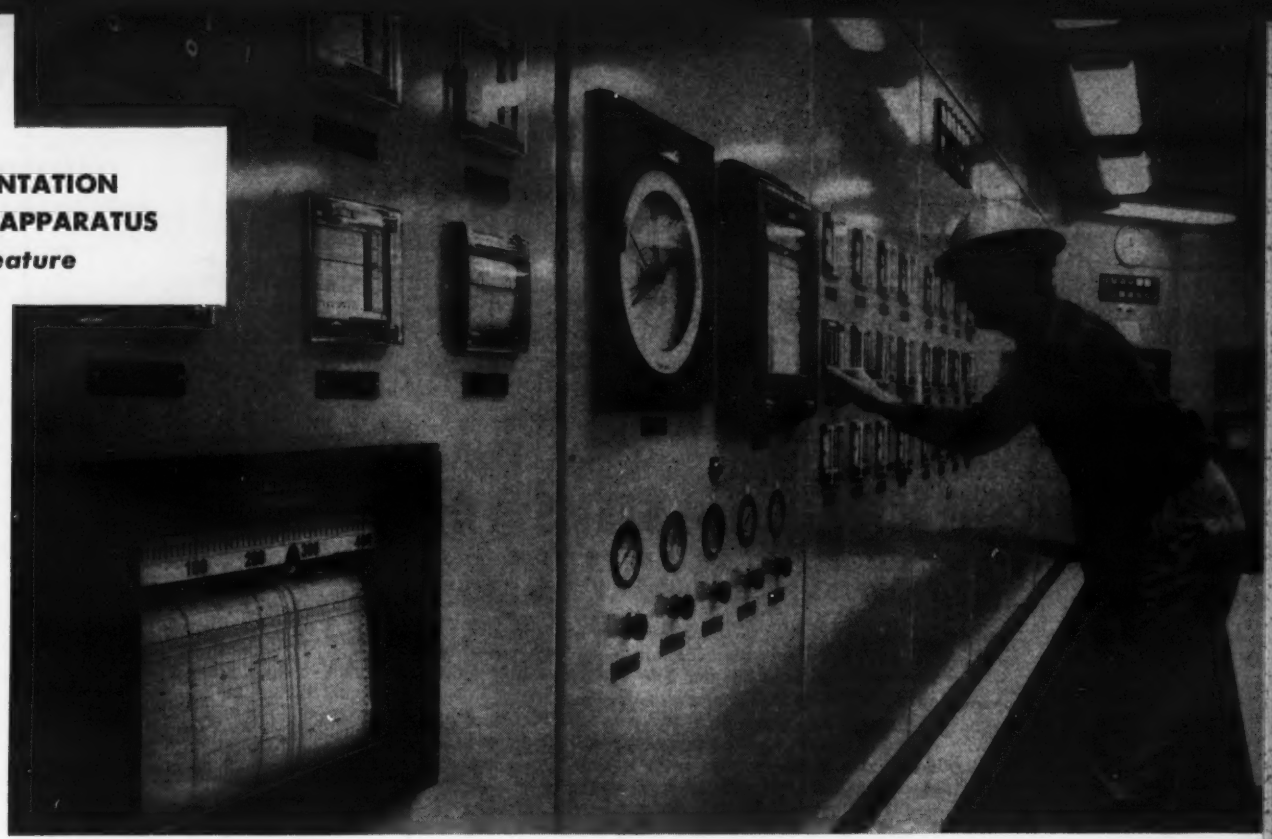
Viscometer controls varnish viscosity, reduces product waste 135

Automated transfer system keeps carbon black on tap 140

Plus . . .

Many other articles on the latest instruments and methods for process control in the plant

PROCESS INSTRUMENTATION AND LABORATORY APPARATUS
. . . Fourth Annual Feature



This highly instrumented plant shows results of successful engineering. Startup of Celanese Corporation of America's new polyethylene plant on a Houston ship canal was efficient and trouble-free. Careful planning before operation has meant no downtime during the first year of operation, except for one planned shutdown

(Celanese Corporation Photo)

Insufficient process knowledge is basic handicap . . . But most difficult problem is securing cooperation, say design and instrument engineers, production and operating men. If group understanding can be developed right from the beginning, along with process data, use of latest design techniques will be more of a certainty. Otherwise, the project may be obsolete by the time it's completed.

'MUSTS' for Modern Instrumentation Are

✔ Process Knowledge ✔ Cooperation Among Engineers

WILLIAM C. CLARKE, Assistant Editor

How can the necessary coordination and cooperation be improved among the groups responsible for bringing a new plant, or a new process, into commercial existence?

These are the questions CHEMICAL PROCESSING asked a group of instrument and process design engineers, production and operating men. Responses contained the continually-repeated phrases that the basic problem was understanding the process, but that the *most difficult* task was developing the necessary coordination and cooperation.

Well-thought-out procedural approaches to these problems in many companies have, the writers indicate, reduced the difficulties of attaining — and continuing to attain — good operating results. Yet something more is needed than a managed cooperation.

Some companies follow the practice of having operating people follow the design phase very closely to stimulate good results.

Other companies consider the development of cooperative attitudes within a group as first responsibility of supervision, leading directly to expediting use of the latest design techniques. Rapid obsolescence is thus avoided.

Basic Instrumentation Difficulties

First . . . insofar as the initial instrumentation difficulties are concerned, Runne C. Ohrberg, Analytical Section Engineer, Instrument Division of M. W. Kellogg Company, says:

"The basic problem in designing and setting up the instrumentation for a new plant, or a new process, is one of understanding the process.

"What are the end products and how does the equipment function to achieve these products?

Continuous analyzers or testers have proven their worth in the plant to keep a check on product quality. With use of high-speed computers it is now possible to study process relations such as steady state conditions of fractionating towers with respect to temperature and concentration variables. Thus the optimum control system can be determined which utilizes the most significant process variables.

"Since calendar time does not permit complete investigations on every project it seems worthwhile to systematically catalogue each type of fractionating tower as to composition and temperature pro-

Emery NEWS

WEIGHING SYSTEM

BIN, TANK AND HOPPER EDITION No. 10

Covering design, development and application data on Emery Weighing Systems for industrial applications.

ANNOUNCING THE NEW WAY-PAC* LINE OF LOW-CAPACITY LOW-PRICE PACKAGED SYSTEMS FOR TANK WEIGHING

SIMPLICITY OF SELECTION AND OPERATION IS KEY FEATURE OF SUPPLEMENTARY LINE

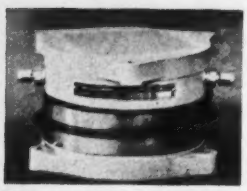


FIG. 1 TYPE AC-1 CELL COMPRESSION.

FIG. 2 TYPE AC-1 "ROLLING-BALL" CELL.

FIG. 3 TYPE AD-1 CELL DYNAMOMETER.

FIG. 4 TYPE AT-1 CELL TENSION.

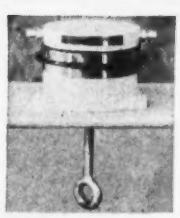


FIG. 5 TYPE AU-1 CELL TENSION.

The WAY-PAC, a new line of Emery low-capacity, low price packaged hydraulic tank weighing systems, designed specifically for the 0 to 1000 lb. range, is now being offered to the process industries.

The accuracy of the WAY-PAC cells is ¼ of 1% of range. This extreme accuracy depends upon two significant design features . . . a moulded rubber diaphragm which maintains a constant acting area and a rolling ball assembly which performs the dual function of practically eliminating friction in the "piston-cylinder" assembly as well as preventing deleterious pinching of the diaphragm in the event of cross loading.

Five different cell types are available in the WAY-PAC line, each designed to perform with typical Emery excellence under different sets of operating conditions. (See Figs. 1 to 5).

The cells are manufactured of aluminum and a top grade bar stock steel to eliminate any possible leakage of the film of oil sealed in the diaphragm.

Unique design features, coupled with the ultimate in manufacturing craftsmanship, have produced in the WAY-PAC line equipment capable of long service life with extreme accuracy under the most rigorous conditions.

A complete line of related equipment is available including: tank pivots, strut assemblies, indicators and recorders. Although controlling and printing equipment can be supplied with and can be operated from the WAY-PAC cells, it is desirable that our engineers know the details of the installation in order to make a recommendation.

*Trademark

Exclusive "Rolling Ball" Head Available in WAY-PAC LINE

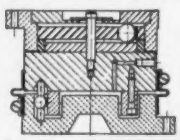


FIG. 6 CROSS SECTION OF "ROLLING-BALL" CELL.

To prevent damage from possible crosswise movement of the tank, bin, hopper or structure being weighed, we have incorporated into the WAY-PAC cell line the exclusive Emery "rolling ball" head.

In essence, the WAY-PAC "rolling ball" head consists of three ½" diameter stainless steel balls built into the top platen of the cell, riding top and bottom on hardened steel plates. (See Fig. 6). In operation, any crosswise movement, such as that incurred in the expansion and contraction of the structure being weighed, rides on the stainless steel balls and is transmitted through them to the diaphragm.

Load cells which do not take expansion and contraction into consideration are not properly designed and cannot compare with the WAY-PAC.

Moulded Rubber Diaphragm Gives Constant Acting Area

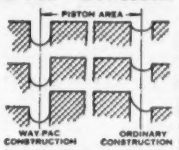


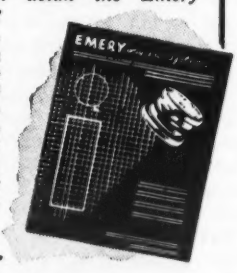
FIG. 7

The moulded rubber diaphragm used in the WAY-PAC cells possesses a unique "rolling action" which imparts constant acting area to the cell. This "rolling action" is illustrated in Fig. 7.

Because of this constant "rolling action", the Emery WAY-PAC load cell is extremely and consistently accurate.

NEW WAY-PAC BULLETIN 582 AVAILABLE FOR DISTRIBUTION

Our new Bulletin 582 which describes in detail the Emery WAY-PAC line and provides an easy-to-use method of figuring your system costs is now off the press. Send for your copy right away.



PRECISION SINCE 1872 — THE A. H. EMERY CO. — FORCE MEASUREMENT

THE A. H. EMERY COMPANY

Pine Street • New Canaan, Conn.

files with variable overhead or bottoms purities. This data would be developed as functions of feed composition, reflux rate, or reboiler duty, being varied within the operable limits of the tower design.

"Such systematic studies can also be made for heat transfer equipment and compressors, and less common processing equipment. These can be used to provide a better understanding of what the controls *must* accomplish.

"Dynamic analysis studies have great potential in optimizing the complete system design. However, dynamic analysis has not yet been developed to the point where it can be economically justified in the design stage of a product."

New Process or New Plant?

Whether a new process or a new plant is involved, based on a well-understood process, affects the approach. If operating experience is available in the production people on the process to be used, this operating experience should be made available. Any lack of familiarity of the design engineers wth a process can be overcome by having an operating man assigned to the project in at least an advisory capacity. But a new process must be handled differently.

"The first problem" says T. B. Nantz, Director of Plants for B. F. Goodrich Chemical Company, "is to make certain the research and development personnel give the problem of instrumentation their attention during the development stage.

"The next problem is to be sure the design group has all the information transmitted to them from development including the requirements for quality, safety, accuracy, and problems of control.

"After consulting with the operations group and considering need for graphic panels, available space, instrumentation required for minimum man-power, and other factors, a proposal can be prepared.

"The next major problem is to get development, design, and production groups in

Check 1164 opposite last page

agreement — securing a system at minimum expense for maximum results.

"Where a new unit is going into a new plant site, and operating personnel have not been selected, the design group must struggle alone with the problem of instrumentation philosophy. Their past installations will be used as a source of guidance."

Spending More Than Necessary

One of the very real difficulties of instrumenting a plant is to do the job well enough that the plant goes "on stream" on schedule. Cost of lost production is so staggering that designers cannot take any chances. And the complexity and need for precise control of modern chemical plants are reflected in the increasing proportion of plant investment represented by instrumentation.

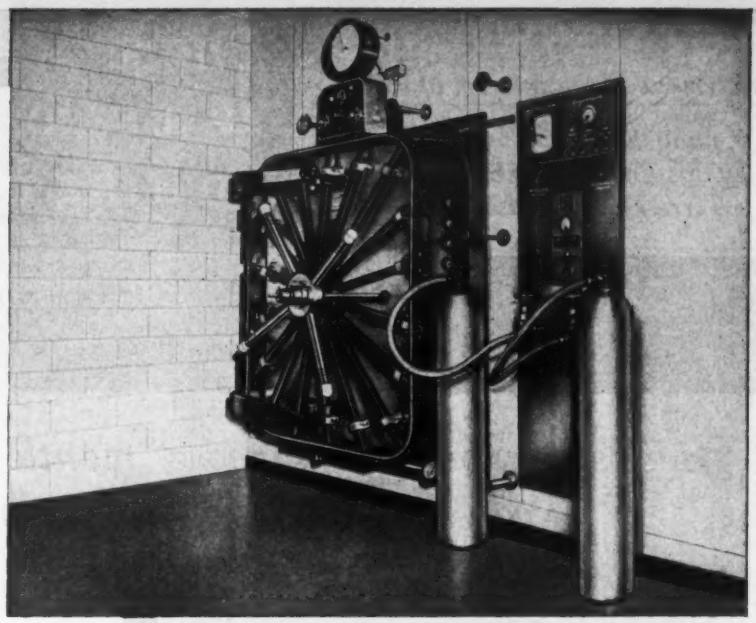
"In this situation one can easily 'go overboard' and spend more than is really necessary" states D. G. Morrow of the Engineering Department of Hercules Powder Company.

"Even with a centralized control panel, some outside

To page 229

"Nature sure is wonderful, to be able to take a little piece of carbon and produce a diamond simply by subjecting a boy friend to tremendous pressure."

Looking for authoritative answers on Ethylene Oxide Sterilization of Heat- and Moisture-Sensitive materials?



American Sterilizer installation of large rectangular autoclave with automatic control for carboxide gas sterilization of heat- and moisture-sensitive materials. Routine sterilization with pressure steam is also accomplished automatically in this unit. Other equipment available ranges from the 16"x16"x30" self contained *Cry*-O-Therm to 60"x 66"x 120" single- or double-door models.

WHY ETHYLENE OXIDE?

As long as ten years ago, American Sterilizer researchers settled upon Ethylene Oxide (inerted with suitable diluents) as the agent of choice for the rapid and dependable sterilization of heat- or moisture-sensitive materials. Advances in such varied fields as pharmaceuticals, surgical supplies and packaging have greatly broadened the range of applications for which this versatile sterilizing agent is recommended. But they have also clearly signaled the need for a precise relationship between such factors as temperature, humidity, pressure, exposure, concentration and diluents in effecting optimum conditions for each specific application.

WHY AMERICAN STERILIZER?

Our ten year study of the characteristics of Ethylene Oxide has been paralleled by an equally thorough development of instrumentation. As a result, American Sterilizer techniques and installations are successfully serving an ever-widening range of industrial and commercial processes requiring the sterilization of heat- and moisture-sensitive materials.

Because we have accumulated the largest body of data and experience in this field, we can advise you authoritatively. Because we offer the broadest range of automatic equipment for standard or special application you enjoy significant benefits of economy and continuing efficiency.

SEND FOR THIS FREE BASIC LITERATURE

Basic literature on "Ethylene Oxide Sterilization for Industry" is available upon request. Engineers of our Scientific Division are "on call" for consultation on processes, techniques or packaging and Experimental and Pilot Plant facilities are available through our Research Division.

Write for Bulletin 1C-602

AMERICAN STERILIZER
ERIE • PENNSYLVANIA

Scientific Division

Check 1165 opposite last page

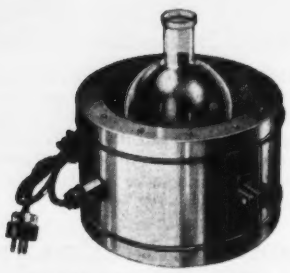
A statement in the interest of safety

...published by
Glas-Col Apparatus Co.
Terre Haute, Indiana

There is no such thing as a safe, all-purpose heating mantle

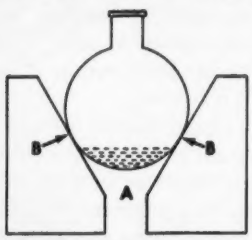
...if you're heating a flask, you need a flask heating mantle. | *...if you're heating a funnel, you need a funnel heating mantle*

Here's why one "all-purpose" mantle can't do the job of two mantles

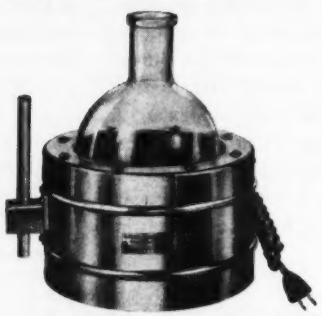


Funnel heating mantle with flask

Look at this picture of a spherical flask in a heating mantle designed for a funnel. Obviously it doesn't fit.

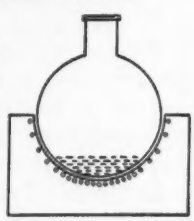


This simplified cross-section drawing shows three reasons why Glas-Col definitely does not recommend the so-called multi-size mantle for heating spherical flasks. First, a dangerous air space exists around the bottom half of the flask where explosive vapors can accumulate if the liquid being heated boils over (see point A in sketch); second, the mantle provides for little, if any, heat around the bottom center area of the flask. In a fractionation where the highest boiling fractions remain until the last, it is this area that needs the greatest heat input to force these high boilers over; third, the only point of contact between the spherical flask and the funnel mantle is in a relatively narrow band running around the flask slightly below its equator (see point B in sketch). Contact is quite limited and extremely poor. Heat transfer and efficiency suffer. In instances where this point of contact is above the liquid level, the flask wall is subjected to severe overheating which can result in superheating of vapors, damage to heat-sensitive chemicals that may splash against the flask wall, and flask breakage due to thermal shock when relatively cool liquid comes into contact with flask wall.



Flask heating mantle with flask

In contrast, look how snugly this Glas-Col Flask Heating Mantle fits this spherical flask. As shown in the cross-section sketch, there is no area below the bottom of the flask where explosive vapors can accumulate if the liquid being heated boils over. Heating elements are closer together around the bottom center where the greatest heat is needed to force over highest boiling fractions which remain to the last. But near the equator, the heating elements are farther apart . . . heat input is less . . . and the bare flask wall cannot be heated excessively.



Funnel heating mantle with funnel

Here's how a funnel heating mantle should be used . . . for a funnel, not a flask. Contact between funnel wall and mantle is complete. Efficient heating results. There are no safety hazards.

In the interest of safety and efficiency, it pays to use the right mantle for the job . . . a Glas-Col Flask Heating Mantle if you're heating a flask . . . a Glas-Col Funnel Heating Mantle if you're heating a funnel.

For additional information on Glas-Col Heating Mantles, ask for a copy of bulletin No. 4.

Glas-Col Apparatus Company, *Dept. CP, 711 Hulman Street, Terre Haute, Indiana*

...the world's largest manufacturer of heating mantles

U.S. Patents 2,282,078 2,739,220 2,231,506 and 2,739,221

GLAS-COL

ELECTRIC HEATING MANTLES

A complete line for laboratory, pilot plant, and chemical process heating applications.

Moved Recently?

If you have, you will want to make sure that your copy of CHEMICAL PROCESSING will continue to come to you on time.

Maybe . . .

you have received a promotion and have been transferred to a new location.

Or, if you have changed your affiliation, we want to make sure that your copies of CHEMICAL PROCESSING will follow you.

Fill out . . .

the slip opposite the back cover. Be sure to answer all questions regarding your new location, title, and company.

In addition, give us your former address, including company, city, state.

Mail this slip to the Reader Service Department and we will make sure you will continue to receive each issue of the magazine promptly.

For more information on product at left, specify 1166 see information request blank opposite last page.

Rotameter transmitter converts flow data to air signal

Magnetic linkage gives positive action

Uses: Converting motion of the rotameter metering float into an output air pressure, providing precise indication at point of measurement.

Features: Rotameter transmitter has magnetic linkage between metering float and indicator.

Description: Pneumatic flow rate transmitter converts long linear motion of a rotameter metering float into rotary motion for flow rate indicating, transmission, or alarm. Unit

Rotameter transmitter shows percent flow, gives output signal

permits a building-block system of adding accessories to perform other functions for recording, control, or integration.

Instrument operates by translating float movement into a rotary action. As float moves, a helix assembly is caused to turn. Helix is encapsulated in a non-magnetic tube floating between two miniature bearing races.

With movement of metering float, a flow sensing cam is turned to develop a pneumatic signal. Supply air pressure should be 20-25 psig. Scale reading is in percent flow. Output signal range is 3-15 psig.

(MPT-50 pneumatic flow rate transmitter is product of Brooks Rotameter Company, Lansdale, Pa.)

Check 1167 opposite last page.

How Much Steam Should a Steam Trap Trap?

. . . some answers to commonly asked questions about the primary job of a steam trap

You don't need a doctor's degree in thermodynamics to answer the question at the top of this page. Naturally, a steam trap should trap *all* the steam.

Unfortunately for you, the problem isn't quite that simple. After all, a shut off valve would trap all the steam . . . and condensate, and air, and carbon dioxide as well.

So we'd better amend the answer to the question this way: A steam trap should trap *all* the steam but *must* remove condensate, air and carbon dioxide as rapidly as they accumulate.

With this established, let's take a closer look at what's involved:

A Steam Trap Should Trap All The Steam

If you've had experience with several different makes of traps, you already know that some trap steam better than others. The operating principle of the trap is what makes the difference. We like to talk about it because Armstrong traps are designed so that no steam can get to the orifice. The valve is always water sealed. Result: *More efficient steam utilization, lower fuel costs.*

A Steam Trap Should Remove Condensate

All traps remove condensate—after a fashion. For maximum efficiency in the unit being drained, though, the trick is to get it out without waiting for it to cool and without leaking steam.

Armstrong's water sealed valve takes care of steam leakage. The inverted bucket operating principle opens the trap for water regardless of its temperature. This means you get the condensate out as quickly as it accumulates. Result: *Higher temperatures and better heat transfer in steam heated units.*

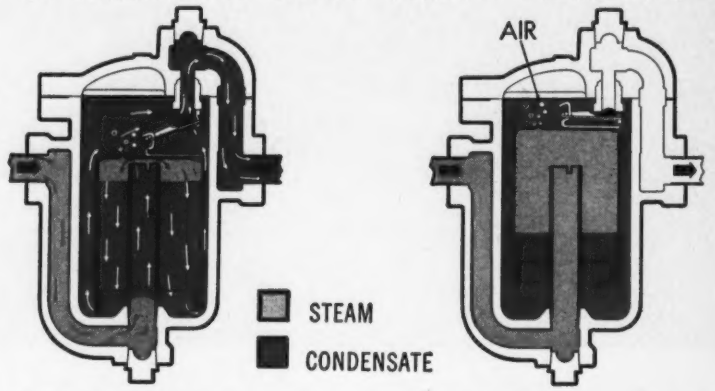
A Steam Trap Should Remove Air and CO_2

Part and parcel of the condensate removal problem is removal of air as well as oxygen and carbon dioxide—two real troublemakers. Air tends to reduce operating temperatures and interfere with heat transfer. CO_2 goes into solution to form corrosive carbonic acid which, for example, can eat unit heater tubes. O_2 aggravates the situation. Believe it or not, but all traps don't properly remove air and CO_2.

By now, you've probably guessed that Armstrong traps *do* remove air and CO_2. Armstrong design (see illustration) provides continuous venting of air and CO_2. By opening suddenly, the Armstrong trap creates a momentary pressure drop to "pump" the air down to be vented. Result: *Higher temperatures, faster heat-up, better heat transfer and reduced corrosion.*

Note: When required, specially sized air vents are furnished. For fast heat-up of low pressure on-and-off units, Armstrong provides open float and thermostatic air vent traps.

HERE'S THE STEAM TRAP DESIGN THAT GETS RID OF CONDENSATE AND AIR WITHOUT STEAM LOSS



Trap open. Condensate entering trap has caused bucket to lose buoyancy. Weight of bucket times leverage pulls valve open. Air is discharged along with condensate.

Trap closed. Steam has floated inverted bucket; valve is held tightly closed by system pressure. Air entering trap passes through bucket vent and accumulates at top of trap.

What's the Final Answer?

Summing it all up, you'll get the best service from steam heated units that are equipped with traps designed to trap *all* the steam and remove air and condensate as quickly as it accumulates. In our prejudiced viewpoint, this means Armstrong traps. More important are the several thousand users of Armstrong traps who have proved the point.

Before you make up your mind, though, consider the minimum maintenance requirements of Armstrong traps . . . and the convenient assistance your local Armstrong Representative provides. These are important plus values.

Put Up or Shut Up

We're so confident that we "put up". Armstrong traps are unconditionally guaranteed to satisfy. So you can find out for yourself with practically no risk. If you're not completely satisfied with the way they do their job, you can get your money back.

* * *

The 44-page Armstrong Steam Trap book goes into greater detail on these and other Armstrong features. It also discusses trap selection, installation and maintenance. Ask your Armstrong Representative for a copy or write

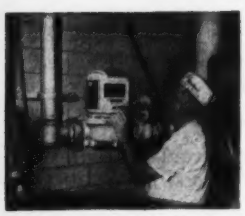
Armstrong Machine Works
8309 Maple Street
Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

Check 1168 opposite last page

Stop costly giveaways...
Stop down-the-drain losses with

NEPTUNE *liquid* METERS



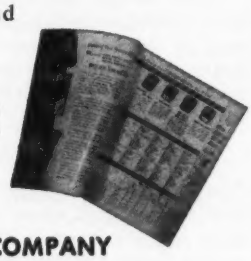
IN ICE CREAM TOO—this ice cream plant gets taste-control by metering to make sure exactly the right amount of corn syrup goes into the mix. Operator simply presses buttons on the Neptune Auto-Stop to set the amount of corn syrup to be delivered . . . opens the valve . . . and the meter shuts off automatically. Ticket printing meters also available.

Sizes from ⅝" to 6", 2 to 1000 gpm. for handling over 150 liquids.

Get built-in cost control with Neptune meters . . . like this Stein-Hall plant making liquid adhesives. They always *know* how much water and vinyl acetate is used . . . and, hence, how much their product costs. The meter doesn't forget, doesn't get tired and doesn't mis-count.

Besides controlling costs with their Neptune meters Stein-Hall now gets consistent quality control of each batch of adhesive. No more rejected batches.

Ask for helpful Metering Bulletin 566-BP



NEPTUNE METER COMPANY
19 West 50th Street, New York 20, N. Y.

neptune liquid METERS

Branches in: ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES • LOUISVILLE • No. KANSAS CITY, Mo. • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO (Millbrae) • IN CANADA: TORONTO 14, ONT

Check 1169 opposite last page

PROCESS INSTRUMENTATION and LABORATORY APPARATUS
. . . Fourth Annual Feature

Automatic soap-making controller provides precise batching in major synthetic rubber plant and . . .

Savings Pay For Control System in 30 Days

PROBLEM: Production of thousands of pounds of out-of-specification rubber each week was cause of a large portion of plant losses being experienced by Phillips Chemical Company's copolymer plant at Borger, Texas. Reason for loss was that soap solutions needed in the rubber manufacturing process frequently did not meet the required chemical analyses.

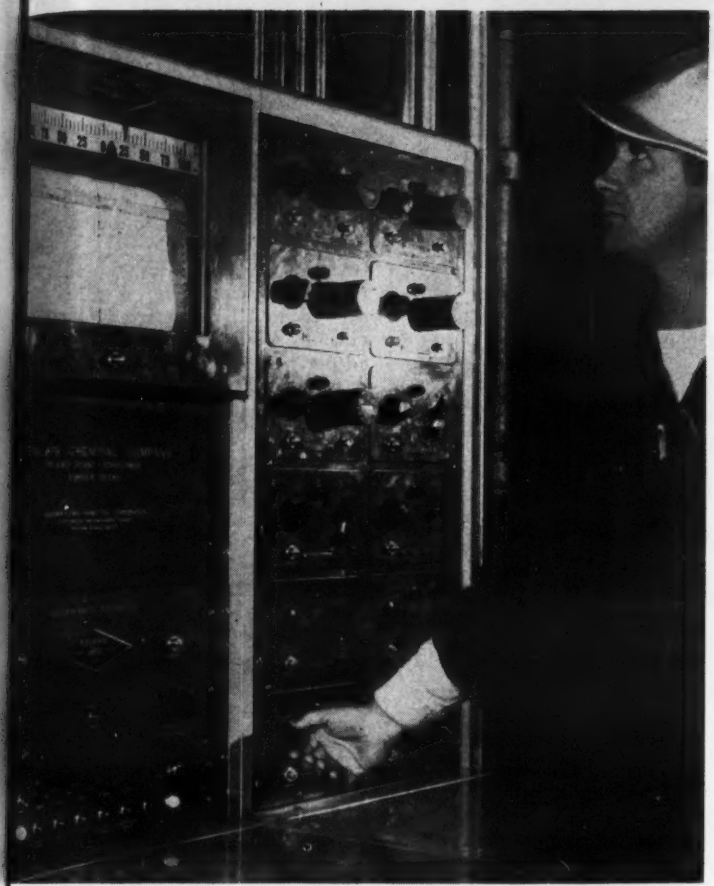
Phillips Chemical Company, wholly-owned subsidiary of Phillips Petroleum Company, manufactures a variety of organic compounds. The Borger plant is an integrated producer of tire-type synthetic rubber from raw materials to the finished product. The plant has a capacity of 108 thousand long tons annually.

In the production of rubber, the reaction occurs in an emulsion formed by agitating two monomers in a solution of soap and water. A different soap formula is used depending on type of rubber produced. Some additives in soap formulation are used in such small quantities that it is difficult to establish their presence quantitatively by chemical analysis.

Formulation of the soaps was handled by beam and lever devices read out on a calibrated scale. Some liquids were added by sight gages. Small amounts of chemicals were weighed on a hand scale. With age and usage, calibration of the mechanical lever systems drifted.

Opportunity for both human and mechanical error was present at every weighing.

Motor valve receives signal from sequence controller and controls the precise addition of ingredients into 80,000 pound mixing tank



Here's the automatic sequence controller which permits the saving of thousands of pounds of rubber every week. Continuous strip chart recorder which charts the results of each operational cycle is upper left. Panel at right contains twelve manual and automatic controls for every step in the vital soap-making process

Also — the actual formulating required a considerable amount of human labor. Another factor was that the system did not lend itself to good housekeeping.

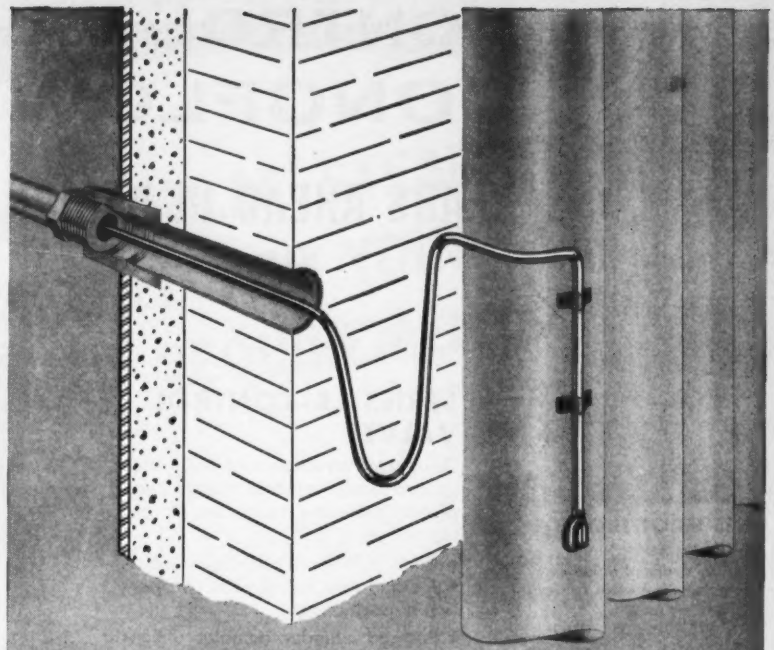
Solution: An automatic soap-making sequence controller now controls precisely each formulation in an 80,000 pound mixing tank. A small tank of 1500 pound capacity is used for dry ingredients which must be dumped "en masse" at the correct time into the mixing tank. A sequence batch controller provides batching of any sequence of ingredients in any amount.

Consistent Accuracy of ± 0.1%

Reducing chances for human error in formulation, soap-batching instrumentation system has achieved consistent weighing to an accuracy of ±0.1%. This accuracy has been developed with use of load cells, a dribble feed system, and a controller that re-zeros itself prior to each addition of an ingredient.

All batching phases are accomplished in a mixing tank supported by four load cells of 20,000 pound capacity each. Another small weigh hopper is supported by three load cells of 500 pound capacity each. Digital weight sets for the 80,000 pound tank are readable by integral numbers to 10 pounds and may be set closer by interpolation of the last digit. Repeatability of control switching on this tank is ±2 pounds in 80,000 pounds during operation.

In operation of this tank, a considerable "over-shoot" is encountered. This over-shoot is repeatable and subtracted from the dial digital weight in



Ceramo® Thermocouples For Furnace Tube Walls

Cut Installation Time 75%

Installation time, always a high-cost factor with furnace tube wall thermocouples, has now been reduced up to 75% by Thermo Electric. Responsible for this reduction is T-E's "Ceramo" construction—ceramic-insulated conductors with overall metal sheathing. Conventional, rigid assemblies were both costly and difficult to install. "Ceramo" furnace tube wall thermocouples virtually eliminate these difficulties.

Applications

These thermocouples measure the increase in outer tube wall temperature when coking or scaling of the inner wall causes a loss of heat transmission. They are used on furnace tubes, superheaters, pre-heaters, and for determination of start-up temperatures.

Advantages

"Ceramo" furnace tube wall thermocouples can be bent to almost any shape—greatly simplifying difficult installation around tubes.

Large holes in the furnace wall, previously required to accommodate the motion of old-style, rigid assemblies, are no longer necessary. "Ceramo," though basically rigid, will flex with the differential motion between tubes and furnace wall. "Hot spots," resulting from faulty insulation around large, rigid assemblies, are also eliminated.

Since "Ceramo" measuring junctions are completely enclosed, they need only be tack welded to the tube wall. There's no need to seal-weld the entire outer end of conventional, open-end protection tubes. "Ceramo" is generally used *without* protection tubes.

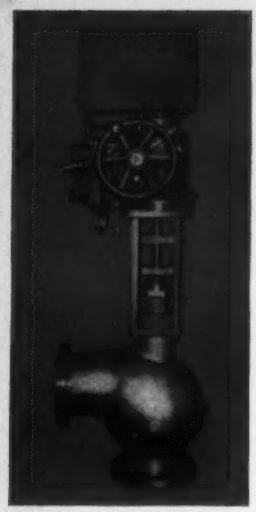
"Ceramo" construction provides extremely small O.D.'s—ranging from 1/16" to 7/16".

Write For Bulletin EDS-54-V

Thermo Electric CO., INC.
SADDLE BROOK, NEW JERSEY

In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ont.

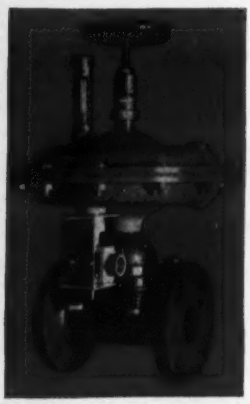
Check 1170 opposite last page



SERIES S CONTROL VALVES

Specifically designed to handle the tough services which cause ordinary valves to fail.

- Sizes to 14"; pressure ratings to 2500 lbs.
- Extra heavy body construction exceeds ASA standards.
- Self-sealing bonnet will not leak regardless of temperature or pressure conditions.
- Patented Rotomotor actuator handles large sizes with high power requirements.



SERIES HB SAUNDERS VALVES

Original close-coupled design introduced by Conoflow has long been an industry standard.

- Completely engineered factory assemblies assure premium performance.
- Actuators for on-off or throttling control in all valve sizes.
- Exclusive Bonnet Loading System available for higher thrust outputs.
- Compact construction allows for more economical piping arrangements.

CONTROL VALVES BY CONOFLOW

YEARS AHEAD IN DESIGN

SERIES LB CONTROL VALVES

Quality construction and truly integrated body-actuator design completely outmodes conventional control valves.

- Cono J Positioner sets new industry standards for precise proportional positioning.
- Rugged cylinder actuator utilizes sturdy metal piston and exclusive lipseals which cannot leak.
- Single-seat body design guarantees positive, tight shut-off under any conditions.
- "Lift-out" seat ring can be replaced quickly with a minimum of effort.
- Extra thick body walls give added protection against corrosion and erosion.
- Simplified construction means less replacement parts and substantial inventory savings.

SERIES AB CONTROL VALVES

A line of economical control valves for handling small flows.

- Bodies available in two and three-way design, in all alloys.
- Extra long stroke; double that of conventional valves.
- Suitable for high pressures and corrosive services.
- Completely enclosed spring-over-diaphragm construction is compact and protects spring from atmospheric corrosion.

When you specify Conoflow control valves you get the best valve available for your control application. Write for literature or let us put you in touch with a Conoflow representative qualified to help solve your control problems. Conoflow Corporation, Dept. C-805, 2100 Arch Street, Philadelphia 3, Pa.

SEE US AT THE ISA SHOW—BOOTH 1246

Cono-Controls®

CONOFLOW CORPORATION

FOREMOST IN FINAL CONTROL ELEMENTS

Subsidiary of Walworth

Check 1171 opposite last page

programming. Small weigh tank of 1500 pounds has digital ingredient weight set dials graduated to 0.1 pound and 1 pound depending on the ingredient. Control is to better than 0.1 pound.

Operation is regulated and recorded by controller in console located 50 feet from operation. Continuous strip recorder in console charts all weights and time periods. Permanent record is thus available on each mix.

Operation of the controller is in 12 steps, some of which

One of four 20,000 pound load cells used in scaling of 80,000 pound mix tank. Engineer holds test weight for calibrating control system

can be omitted as necessary. In the first, caustic solution is added automatically to the tank. The second automatically releases water and steam into tank and weighs the addition.

Third phase requires addition of resin and soap. Controller starts tank agitator and operates it until almost all of soap is added. Agitator then stops while final increment of soap is added at slower rate. Fourth step is a timer phase, the mixture being agitated for a specific period. Fifth adds water. Again when nearly all water has been added, agitator is stopped to permit a more accurate weighing.

Steps six, seven, and eight are used to add additional chemicals from small weigh hopper. Ninth step is again a mixing phase. Step ten allows a sample to be drawn for laboratory analysis. Step eleven is a second agitation phase. The last step requires that

the soap batch be transferred automatically to one of two storage tanks.

If because of plugged lines or inadequate supply, any component can't be added to solution at necessary time, sequence controller stops process, lights red light, and proceeds no further until malfunction is corrected. Should faulty valve not respond and introduce excessive quantity of ingredient, signal will be shut down and alarm also given.

At end of each phase, a deviation recorder indicates whether ingredient added was plus or minus its correct weight. Deviations can be corrected in step ten by putting controller in manual operation and adding necessary ingredients semi-automatically. If storage tanks will not hold entire batch, controls prevent starting transfer until tank space is available.

Results: The control system has eliminated a large portion of the plant losses due to out-of-specification rubber. Although the objective of the installation was not to save labor, raw material, or time, but to increase quality control, the savings in raw material and finished product paid for the complete installation in less than one month. A small saving in labor and ten percent saving in process time are also reported.

Since installation of the equipment approximately a year ago, the installation has been in operation 24 hours a day, seven days a week. Maintenance has been mainly preventative.

Sensitivity control is such that a need for further quality control has been suggested on the ingredients used. Further advantage of system is that the formerly tedious aspects of the job have disappeared. Operating personnel have found the operation more interesting and much less laborious.

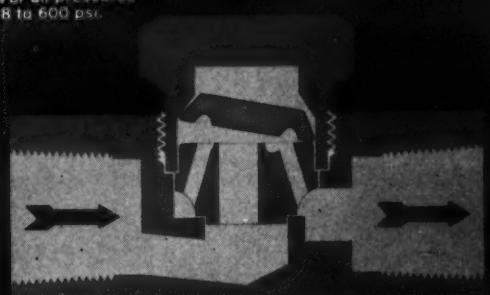
(Automatic soap batching system is product of Electronics and Instrumentation Div., Baldwin-Lima-Hamilton Corp., Waltham 54, Mass.)

Check 1172 opposite last page.

NEW YARWAY IMPULSE* STEAM TRAP ENGINEERED FOR YOUR LIGHT LOAD REQUIREMENTS

YARWAY NO. 30

Actual size new Yarway No. 30 (½" size). For all pressures 8 to 600 psi.



Cross-section Yarway No. 30 shows lever valve in open position.

- Economy of operation on light loads
  - Closer shut-off
  - Quieter operation due to lever action
- Economy of Maintenance
  - Replaceable valve-seat assembly
  - One moving part
  - Stainless steel construction

Put this trap on tracer lines, steam line drips and other light load applications. Order from your local Yarway distributor.

For free bulletin, write Yarnall-Waring Company, 100 Mermaid Ave., Philadelphia 18, Pa.

*IMPULSE . . . A COMPLETE LINE OF STEAM TRAPS, OPERATING ON A PROVEN THERMODYNAMIC PRINCIPLE.

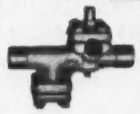
YARWAY impulse® OVER 1,250,000 ALREADY SOLD

USE THESE YARWAY IMPULSE TRAPS FOR ALL OTHER STEAM TRAP NEEDS

NORMAL NEEDS Famous Series 60 Impulse traps (pressures to 400 psi) and Series 120 (pressures to 600 psi) meet most normal needs

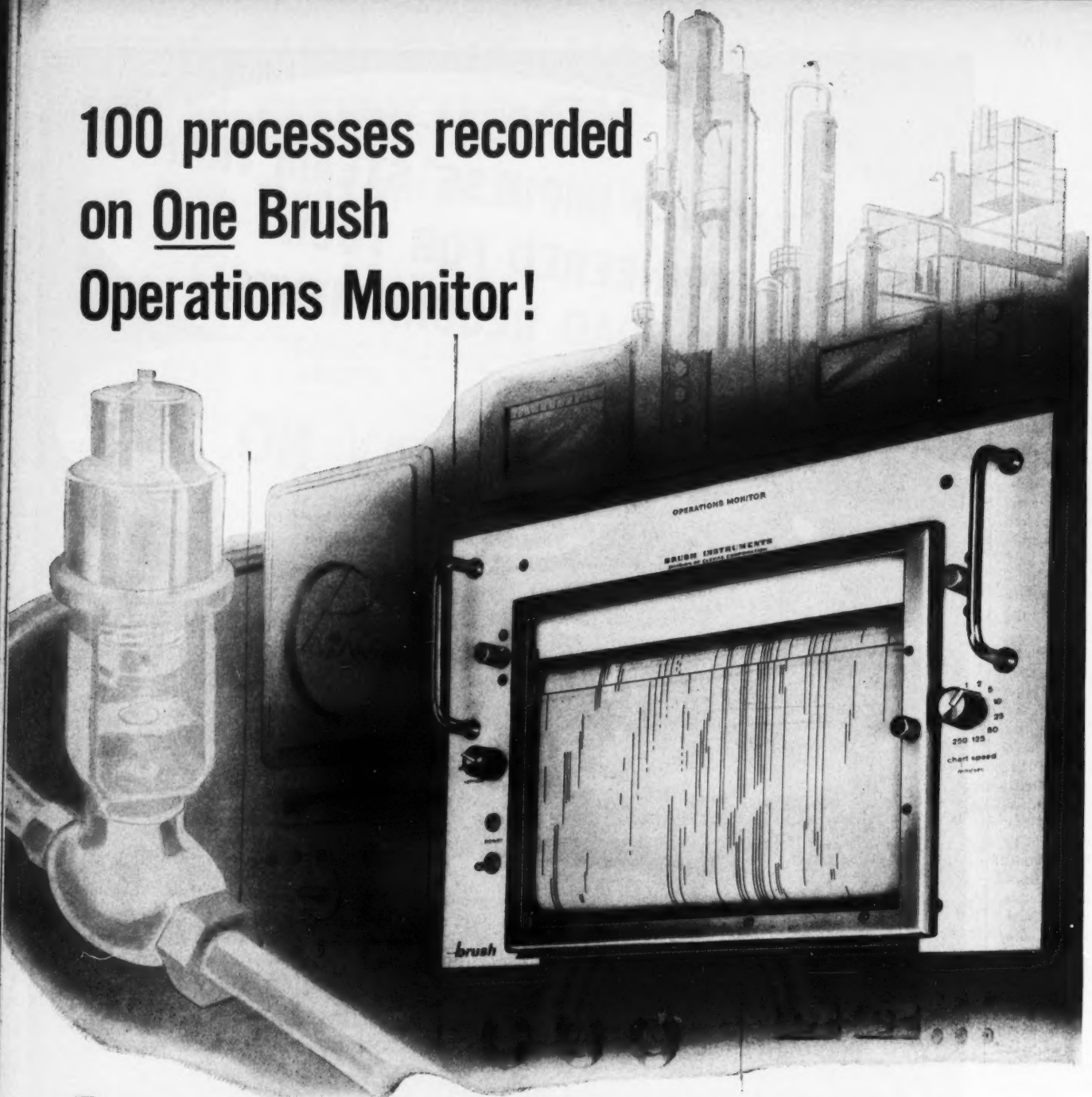
EXTRA HEAVY CONDENSATE LOADS Series 40 Impulse traps have extra large capacity to handle large volumes of condensate

POWER PLANT AND MARINE SERVICE Yarway Integral Strainer Traps fill the bill for marine and high pressure power plant jobs



Check 1173 opposite last page

100 processes recorded on One Brush Operations Monitor!



This compact Brush Operations Monitor can improve the control of power distribution systems, chemical processes and automated production lines.

On a moving chart only 12" wide, 100 separate operations can be recorded at the same time . . . what happens or doesn't happen . . . monitoring present recording and indicating devices. For example, the opening or closing of a valve . . . the action of a relay . . . the control of motors . . . all are documented in a time relationship to other operations. You get an immediate picture of an *entire situation* at any time. Sixteen different time bases can be selected from remote or on-the-spot locations.

Write to Brush for details. Engineering assistance is available at all Brush factory branches, strategically located throughout the United States.

brush INSTRUMENTS
DIVISION OF
3405 PERKINS AVENUE **CLEVITE** CORPORATION CLEVELAND 14, OHIO

WHY BORROW?

You can receive a personal copy of CHEMICAL PROCESSING every month.

Do you know that the magazine can come to you personally without charge, to your designated address?

If you . . .

would like to receive it and if you qualify, the publisher will add your name to the more than 50,000 key men in the chemical processing industries who receive each issue regularly.

The necessary qualifications are outlined on the request form that can be found opposite the inside back cover.

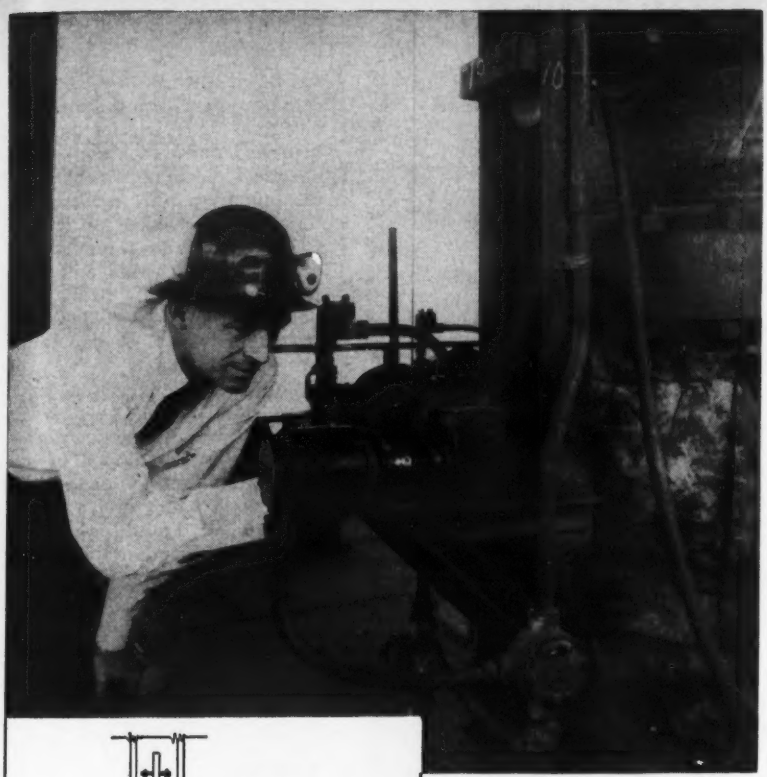
Fill it out, being sure to give all necessary information, and mail to Reader Service Department.

Perhaps . . .

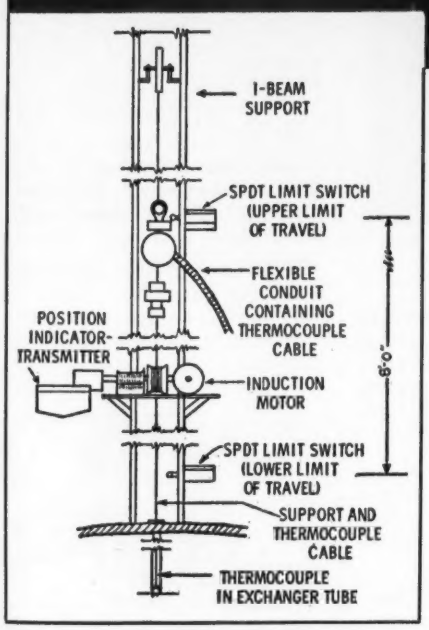
others in your company would also like to receive CHEMICAL PROCESSING personally each month. Include their names on the form opposite the back cover.

Your application for subscription is welcomed.

For more information on product at left, specify 1174 see information request blank opposite last page.



Here's the thermocouple carriage assembly and drive. Engineer is checking the installation. Fractional horsepower induction motor drives a cable drum which, in turn, moves each thermocouple carriage up and down at a constant speed



Simplified diagram of thermocouple carriage assembly and drive. Limit switches control travel of thermocouple within reaction vessel at bottom

Catalytic oxidation of naphthalene to phthalic anhydride at Pittsburgh Coke's Neville Island chemical complex is kept running smoothly when —

Traveling Thermocouples Detect "Hot Spots" in Reaction

A CP STAFF REPORT
with **JOHN F. LOVETT**, Supervisor
Engineering Design and Estimating
Pittsburgh Coke & Chemical Company
Pittsburgh, Pennsylvania

PROBLEM: Oxidation of naphthalene to phthalic anhydride takes place during a catalyst contact time of less than one second at temperatures around 850°F. A granular catalyst is contained in a tube surrounded by a cooling medium. As the air-naphthalene mixture enters the tube, its temperature is raised until the exothermic reaction starts at a very high rate. This produces a "hot spot." After completion of the reaction, the gases are cooled as they pass on out the catalyst tube.

It is essential to know the location and temperature of the "hot spot" in order to effect control of the process through adjustments of feed conditions and cooling temperatures.

Phthalic anhydride — an important intermediate for alkyd resins used in coatings, for pigments, and for phthalate ester plasticizers used in vinyl and cellulose acetate plastics — is made by the controlled oxidation of naphthalene, a coal tar product.

Solution: There are two ways of checking the temperature throughout the catalyst bed at all times: One is to have many thermocouples inserted throughout the bed. The other is to have a necessary number of thermocouples which cover the variation of temperature gradient by moving up and down through the catalyst bed. This latter method requires less instrumentation and increases flexibility.

After deciding to use this second method, Pittsburgh Coke engineers devised a means for raising and lowering the thermocouple system to increase its effectiveness.

A thermocouple well, made of ¼" diameter 316 stainless tubing, is located in each of three tubes spotted throughout the reactor. The well is provided with spacers so that it remains located in the center of each catalyst-containing tube.

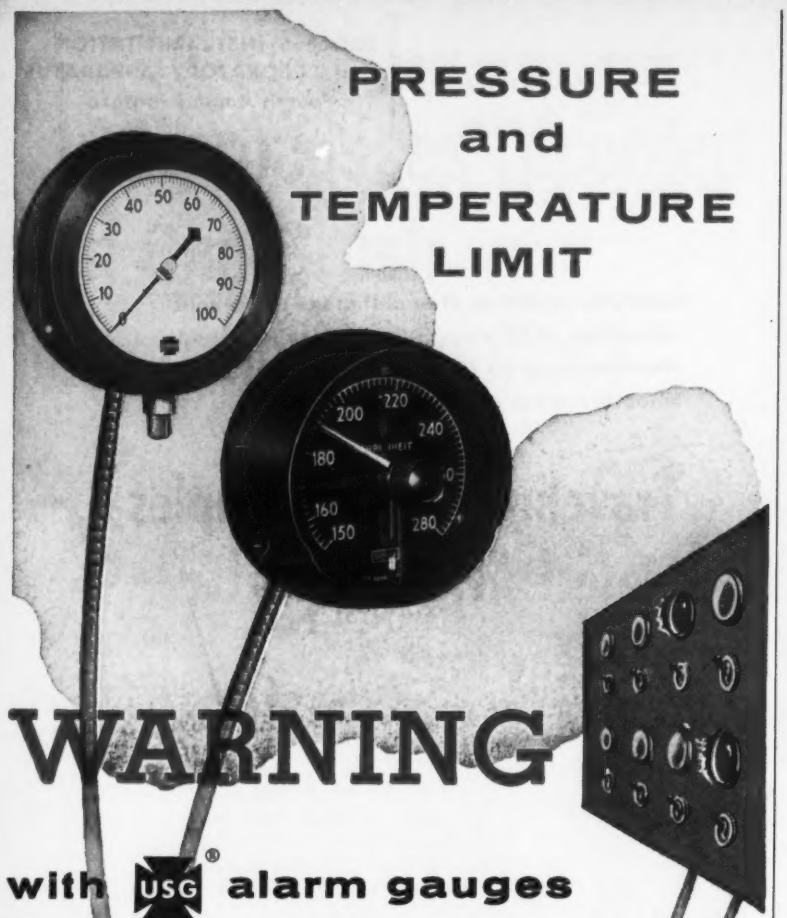
Within each well, a platinum-rhodium thermocouple is inserted. The thermocouple is purchased already assembled, with ceramic insulation and in a smooth stainless steel sheath. The unit is operated by moving up and down within the wall.

Guiding Thermocouples

Each of the three thermocouples, when pulled out above the eight-foot-deep well, is guided by a carriage moving in an eight-foot steel channel. The channel itself is bolted to the top head of the reactor only, and is not restrained at its top. This eliminates any problems caused by thermal expansion and contraction when the reactor is started up or shut down.

For each thermocouple unit, a gear head fractional horsepower induction motor drives

To page 120



These instruments provide a warning signal when temperature or pressure in a process rises or falls beyond predetermined danger limits.

Limit contacts are adjustable over the entire range with a "gap" as narrow as 2%. Suitable for lights, bells, buzzers or other signaling equipment requiring 0.1 amps or less. For larger alarm or relief devices, external relays can be furnished to increase rating to 6 amps.

Instruments may also be used as limit controls and as on-off controls when used in conjunction with lock-in relays and suitable delay tubes.

Available in cast iron or phenolic turret case in 12 pressure dial graduations from 0-30 lbs. to 0-10,000 lbs. Vacuum ranges 0-30". 5 compound dial graduations from 30"-30 lbs. to 30"-300 lbs. Thermometers available in all standard mercury, vapor and gas ranges with phenolic case only.

For complete details call your nearest USG distributor . . . see the "Yellow Pages" of your phone book . . . or write the factory for descriptive literature.

UNITED STATES GAUGE

USG

Home of the SUPERGAUGE®

Division of American Machine and Metals, Inc.
Sellersville, Pa.

SEE OUR EXHIBIT AT THE SEPTEMBER I.S.A. SHOW IN PHILADELPHIA
— BOOTHS 1306 and 1405

Check 1176 opposite last page

Automatic fume hood also operates manually

Safety sash has three-way flexible control

Uses: As laboratory fume hood.

Features: Automatic fume hood can also be operated manually. Safety sash has three-way control for flexibility.

Description: Safety sash can be moved up or down manually, with power on or off, in emergency or power failure.

Automatic fume hood has "inching" control

Push-button control permits "inching" to any desired fixed position. Fully automatic control operates to open safety sash as chemist walks onto floor mechanism.

(Automatic fume hood is product of Laboratory Furniture Co., Inc., Old Country Road, Mineola, Long Island, New York.)

Check 1177 opposite last page.

Fine mesh screens easily cleaned by ultra-sonics

Screen replacement costs cut drastically

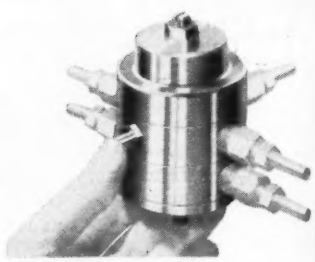
Problem: Minute apertures of 325-mesh screens, coupled with adherent nature of flour-like silica sand, were causing difficult cleaning problem. Processor of silica sand for manufacture of glass and ceramics was using manual cleaning with special bristle brushes and shaking, plus chemical cleaning. Mechanical cleaning frequently caused distortion or breakage of wires. Chemical cleaning tended to erode the fine wires and defeat accuracy of sizing by delivering larger particles. Also, labor was irksome and time-consuming.

Solution: Both manual and chemical cleaning have been replaced by ultrasonic method. Screens are dipped in an ultrasonic tank which contains tepid water and a small quantity of liquid detergent. In exactly one minute a screen 80% clogged becomes virtually 100% clear.

Results: Replacement costs of these expensive screens containing over 100,000 holes to the square inch have been drastically reduced. Because of the minute size of bubbles generated by the ultrasonic vibration, the screens are cleaned without marring any surfaces.

(SonBlaster is product of The Narda Ultrasonics Corporation, 118-160 Herricks Road, Mineola, New York.)

Check 1178 opposite last page.



Signal monitor

. . . instantly trips and monitors minimum and maximum pneumatic signal. Control monitor remains tripped until it is manually reset. Maximum pressure range is 250 psi, minimum trip adjustable 1-100 psi. Unit will not bleed signal air before or after trip.

(Monitor Mite-73 is product of George W. Dahl Co., Inc., Tupelo Street, Bristol, R.I.)

Check 1179 opposite last page.

Ratio computing relay solves equations continuously

Provides proportional or floating control

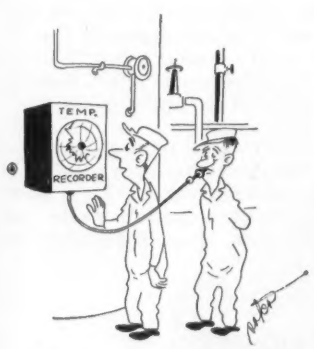
Uses: As control component in pneumatic control systems to provide proportional or floating control actions.

Features: Pneumatic relay solves equations continuously by combining two or more pneumatic signals, providing proportional or floating control.

Description: Pneumatic relay has bellows operator which positions proportional band adjustment in relay. Bellows operator may be actuated by a pneumatic signal from a remote adjuster or pneumatic transmitter. As standard relay, it may also proportion, amplify, reverse, subtract, or totalize pneumatic signals. Unit is adapted to pressure-temperature compensation or remote adjustment of proportional band in single or multi-element pneumatic control systems. Function-generating cam can be shaped on job. Unit uses standard ranges of 3-15 psig and 3-27 psig.

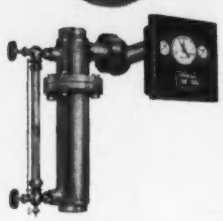
(Remote adjustable computing relay is product of Bailey Meter Company, 1050 Ivanhoe Road, Cleveland 10, Ohio.)

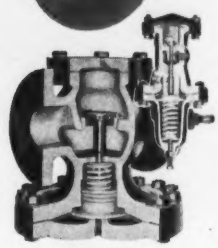
Check 1180 opposite last page.



"Boy! I'll say you're running a temperature!"

SPLIT-BODY VALVES


LEVEL CONTROLLERS


PRESSURE REGULATORS

DIAPHRAGM CONTROL VALVES

KEEP A FIRM HAND ON FLUID CONTROL WITH K&M VALVES ALL ALONG THE LINE

From the complete display on the K & M shelf, you can select the best type of valve for every control job in the process line. You can, in fact, standardize entirely on K&M. That means simplified specification, ordering, maintenance.

Especially maintenance. K & M engineers have put consistent design emphasis on field interchangeability of components. In a pinch, you can "borrow" an inner valve or a topworks assembly from a pressure regulator for use with a diaphragm motor valve. That's what we mean by interchangeability.

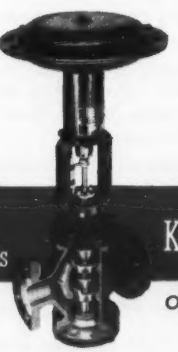
And because the K & M line is so diverse and inclusive, our field representatives are free to make unbiased suggestions on the type of valve best suited to your requirements. That can often mean substantial dollar savings all along the process line.

THREE TECHNICAL BULLETINS GIVE THE IMPORTANT FACTS AND FIGURES. THEY'RE YOURS FOR THE ASKING.

Bulletin 401 Pressure-Regulating Valves

Bulletin 132 Split-Body Valves

Bulletin CV53 Standard Diaphragm-Operated Control Valves



K&M

diaphragm control valves

Our 79th Year

KIELEY & MUELLER, INCORPORATED

Oldest Pressure and Level Control Valve Manufacturer
64 Genung Street, Middletown, New York

S.A. 1721

Check 1181 opposite last page

From page 117

a cable drum, which in turn moves each carriage up and down at a constant 2½ feet per minute speed. (See diagram on page 117.)

This speed is slow enough so that it won't cause buckling of the thermocouple when it is lowered in the well. Each motor is regulated separately from the control room. A selsyn, mounted close to each motor, relays the depth of each thermocouple probe in the catalyst bed to the master panel board in the control house.

At least once each shift, a run-down of reactor temperature is made. This allows the following of any "hot spot" and control of the process by the operator. Adjustment of air or naphthalene flow keeps the "hot spot" within the needed location. The operator averages the three readings in determining its location.

Remainder of Equipment

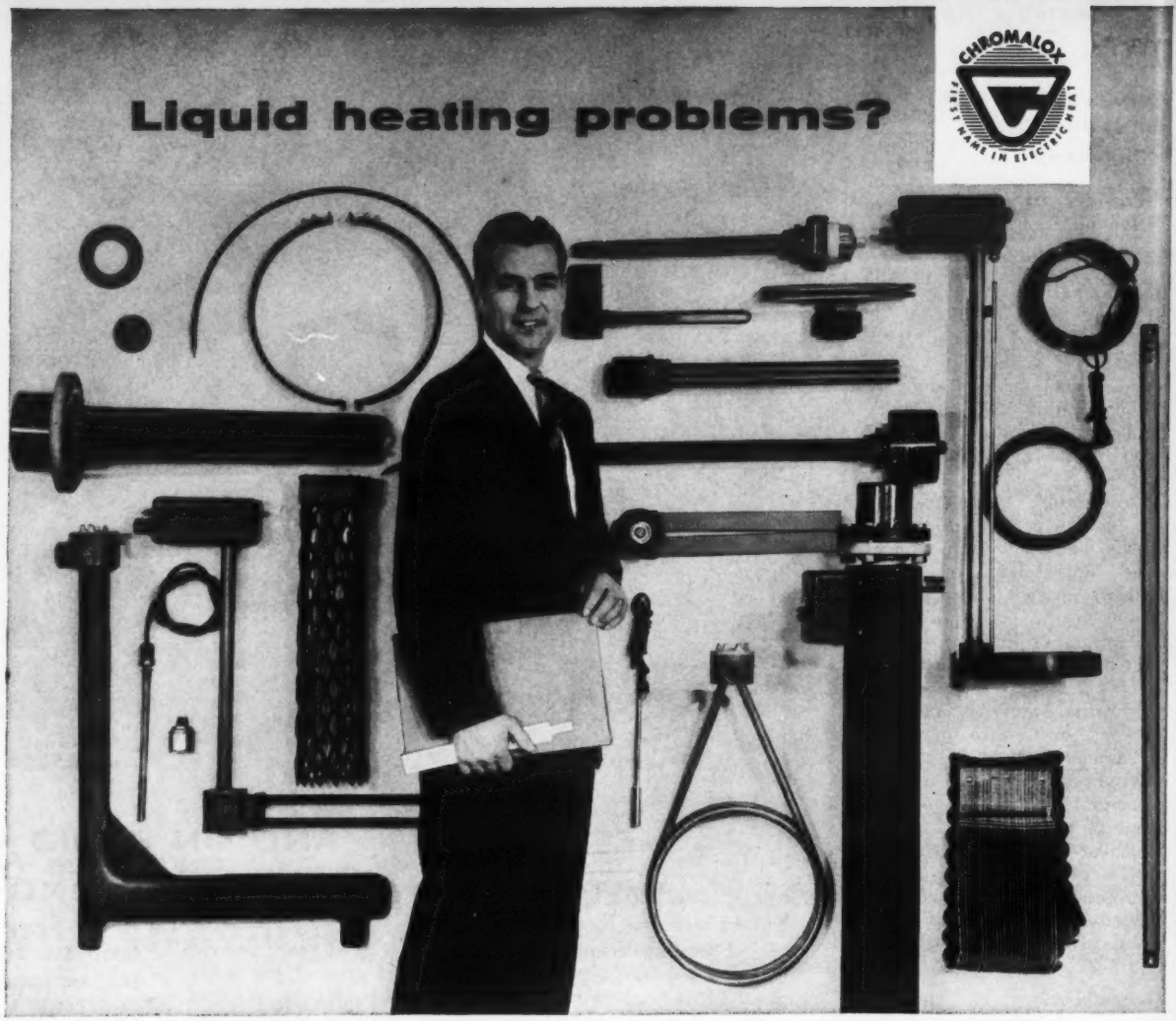
Oxidation of napthalene to phthalic anhydride is exothermic, so a salt bath is used to maintain the correct temperature.

The reactor is a vertical shell and tube heat exchanger, with 1½" diameter tubes, cooled by molten salt on the shell side. The vanadium catalyst is contained in carbon steel tubes which are eight feet long.

Results: Knowing the temperature gradient throughout the reactor, together with a combination of other operating variables — such as ratio of air to naphthalene, temperature, quality composition . . . enables the operator to keep the unit running at optimum throughput and efficiency. The setup has performed very well during the past 1½ years since it has been installed. The system has proven to be efficient, accurate, and easy-to-work.

(Thermocouple assembly and other instruments used in this system were supplied by Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne and Windrim Ave., Philadelphia, Pennsylvania.)

Check 1182 opposite last page.



Call the Chromalox man for the **ANSWERS**

Regardless of the liquid, or your problems in heating it . . . it's a safe bet your Chromalox® Representative has time and money saving answers for you. Backed by the world's most complete electric heating line, he has heaters specifically designed for oils, water, asphalt, paraffin, salt baths, corrosive solutions and heat transfer media. To best suit your application, he has . . .

- Strip, tubular and ring heaters that clamp on, to heat tanks, pipes and kettles by contact.
- Flanged, screw-plug, portable, cast-in and quartz immersion heaters. Both "through-the-side" and over-the-top" models, with either built-in or separately-mounted thermostats.
- Completely "packaged" heat exchangers for water, oil, steam superheating, gases, heat transfer media.
- Neoprene or silicone covered heating cable and flexible woven heaters for hundreds of "wrap-around" applications.

Where but Chromalox can you find such a wide variety? Standard heaters to fit most jobs are ready for immediate shipment from the world's largest stock. What's more, your Chromalox Representative offers factory design-engineering service for special applications.

Get the best answers to all your liquid heating problems. For information on new installations, or assistance in converting an existing system, call or write your Chromalox Sales Engineering Representative. He has the electrical answer that's fast, clean, safe, accurate and economical.

C-2108

CHROMALOX® Electric Heat

Edwin L. Wiegand Company

7517 Thomas Boulevard, Pittsburgh 8, Pennsylvania • CHurchill 2-6400

Check 1183 opposite last page

Call Chromalox

for the man with the
ELECTRICAL ANSWERS
to your heating problems

ATLANTA 9, GA.
Applebee-Church, Inc.
1389 Peachtree St., N.E.
TRinity 5-7244

BALA-CYNWYD, PA.
J. V. Calhoun Co.
349 Montgomery Ave.
MOhawk 4-6113

BALTIMORE 18, MD.
Paul V. Renoff Co.
333 E. 25th St.
HOpkins 7-3280

BLOOMFIELD, N. J.
R. L Faber & Associates, Inc.
1246 Broad Street
EDison 8-6900

BOSTON 11, MASS.
Leo C. Pelkus and Co., Inc.
683 Atlantic Ave.
LIberty 2-1941

BUFFALO 2, N. Y.
Niagara Electric Sales Co.
505 Delaware Avenue
SUmmer 4000

CHARLOTTE 2, N. C.
Ranson, Wallace & Co.
116½ East Fourth St.
EDison 4-4244
FRanklin 5-1044

CHATTANOOGA 1, TENN
H R. Miles and Associates
P. O. Box 172
Phone 5-3862

CHICAGO 5, ILL.
Fred I. Tourtelot Co.
407 S. Dearborn Street
HArrison 7-5507

CINCINNATI 8, OHIO
The Smysor Company
1046 Delta Avenue
TRinity 1-0605

CLEARWATER, FLA.
J. J. Galleher
617 Cleveland Street
P. O. Box 1376
Phone 3-7706

CLEVELAND 13, OHIO
Anderson-Bolds, Inc.
2012 W. 25th Street
PRospect 1-7112

DALLAS 26, TEXAS
L. R. Ward Company
3009-11 Canton Street
RIverside 1-6279

DAVENPORT, IOWA
Volco Company
215 Kahl Bldg.
Phone: 3-2144

DENVER 2, COLO.
E. & M. Equipment Co.
2415 15th Street
GLendale 5-3651
GEnesee 3-0821

DES MOINES 14, IOWA
Midwest Equip. Co. of Iowa
842 Fifth Avenue
CHerry 3-1203

DETROIT 38, MICH.
Carman Adams, Inc.
15760 James Couzens Hwy.
UNiversity 3-9100

HOUSTON 3, TEXAS
L. R. Ward Company
3605 Polk Avenue
CApitol 5-0356

INDIANAPOLIS 4, IND.
Couchman-Conant, Inc.
627-631 Architects & Builders Bldg.
MElrose 5-5313

KANSAS CITY 6, MO.
Fraser D. Moore Co.
106 E. 14th Street
Victor 2-3306

LOS ANGELES 15, CALIF.
Montgomery Brothers
1053 South Olive Street
Richmond 7-9401

MIDDLETOWN, CONN.
Dittman and Greer, Inc.
33 Pleasant Street
DIamond 6-9606

MILWAUKEE 3, WIS.
Gordon Hatch Co., Inc.
531 W. Wisconsin Avenue
BRoadway 1-3021

MINNEAPOLIS 4, MINN.
Volco Company
831 South Sixth Street
FEderal 6-3373

NASHVILLE 4, TENN.
H. R. Miles and Associates
2500-B Franklin Road
CYpress 2-7016

NEW YORK CITY, N. Y.
See "Bloomfield, N. J."
WOrth 4-2990

OMAHA 2, NEB.
Midwest Equipment Co. of Omaha
1614 Izard Street
ATlantic 7600

PHILADELPHIA, PA.
See "Bala-Cynwyd, Pa."
GReenwood 3-4477

PITTSBURGH 6, PA.
Woessner-McKnight Co.
1310 Highland Bldg.
115 S. Highland Avenue
EMerson 1-2900

PORTLAND 5, ORE.
Montgomery Brothers
1632 N.W. Johnson Street
CApitol 3-4197

RICHMOND 28, VA.
(Branch, Charlotte)
Phone 88-8758

ROCHESTER 4, N. Y.
Niagara Electric Sales Co.
133 Clinton Avenue, South
HAmilton 6-2070

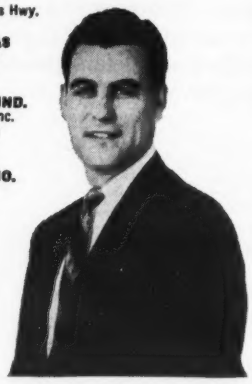
ST. LOUIS 1, MO.
C. B. Fall Company
317 North 11th Street
CHestnut 1-2433

SAN FRANCISCO 3, CALIF.
Montgomery Brothers
1122 Howard Street
UNderhill 1-3527

SEATTLE 4, WASH.
Montgomery Brothers
911 Western Avenue
SEneca 3270

SYRACUSE 6, N. Y.
R. P Smith Co., Inc.
2507 James Street
HOward 3-2748

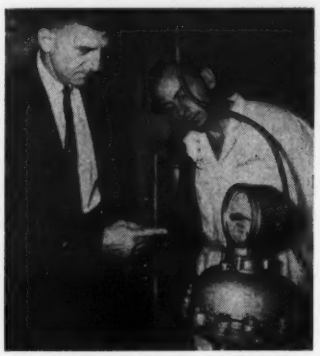
WICHITA 2, KANS.
Fraser D. Moore Co.
Room 211 Derby Building
352 N. Broadway
AMherst 2-5647



Accurate measurement of tank car receipts pays for meter

Problem: Sunnyland Refining Company in Birmingham, Alabama, lacked a reliable automatic method for double-checking quantities of cotton seed oil and soybean oil received in tank cars. Although the cars were scaled before receipt, the company believed it should have another accurate measurement of tank car unloading.

Solution: Flow meter with a totalizer was installed to record flow at the tank car unloading spots.



This oil meter double-checks vegetable oils when unloaded from tank car

In addition to metering oil received in tank cars, unit can be used in metering the movement of oil from one tank to another inside the plant. Oil can also be measured when moved from inside storage tanks to production points in the plant.

Register of meter is electric contact type which gives one electric pulse for every 100 pounds of oil.

Results: Sunnyland Refining Company reports that accurate and automatic control of oil movements within the plant has not only been extremely useful, but several rebates arising out of shortages have been received which alone more than paid for the entire meter installation.

(Niagara oil meter is product of Buffalo Meter Company, 2917 Main St., Buffalo 4, N.Y.)

Check 1184 opposite last page.

...International-LaMont

aroclor* HEATERS

- **AUTOMATIC TEMPERATURE CONTROL TO ±2°F.** *at the heater*—your assurance of dependable process heat of up to 600°F. for uniform product quality—without elaborate secondary controls. Heater responds instantly to changing load demands.
- **FORCED RECIRCULATION** keeps Aroclors constantly moving throughout all tubular circuits of the heater. This feature, coupled with exclusive LaMont orificing, virtually eliminates the possibility of fluid decomposition due to overheating.
- **SAFE, LOW PRESSURE OPERATION** ranging from atmospheric to only 30 psig—which means substantial savings: lower operating and supervising costs . . . no expensive high pressure equipment or controls . . . low installation and maintenance costs.
- **PACKAGED UNITS TO 20,000,000 BTU/HR.** Fully coordinated packaged units . . . complete with burner and controls for oil and/or gas firing.

Get the facts about Aroclor and International-LaMont Aroclor Heaters—designed specifically for dependable, economical generation of high temperature process heat. Write today for Bulletin No. 1300.

*AROCLOR is a registered trade name of the MONSANTO CHEMICAL COMPANY.

IBW BOILER BUILDERS SINCE 1886

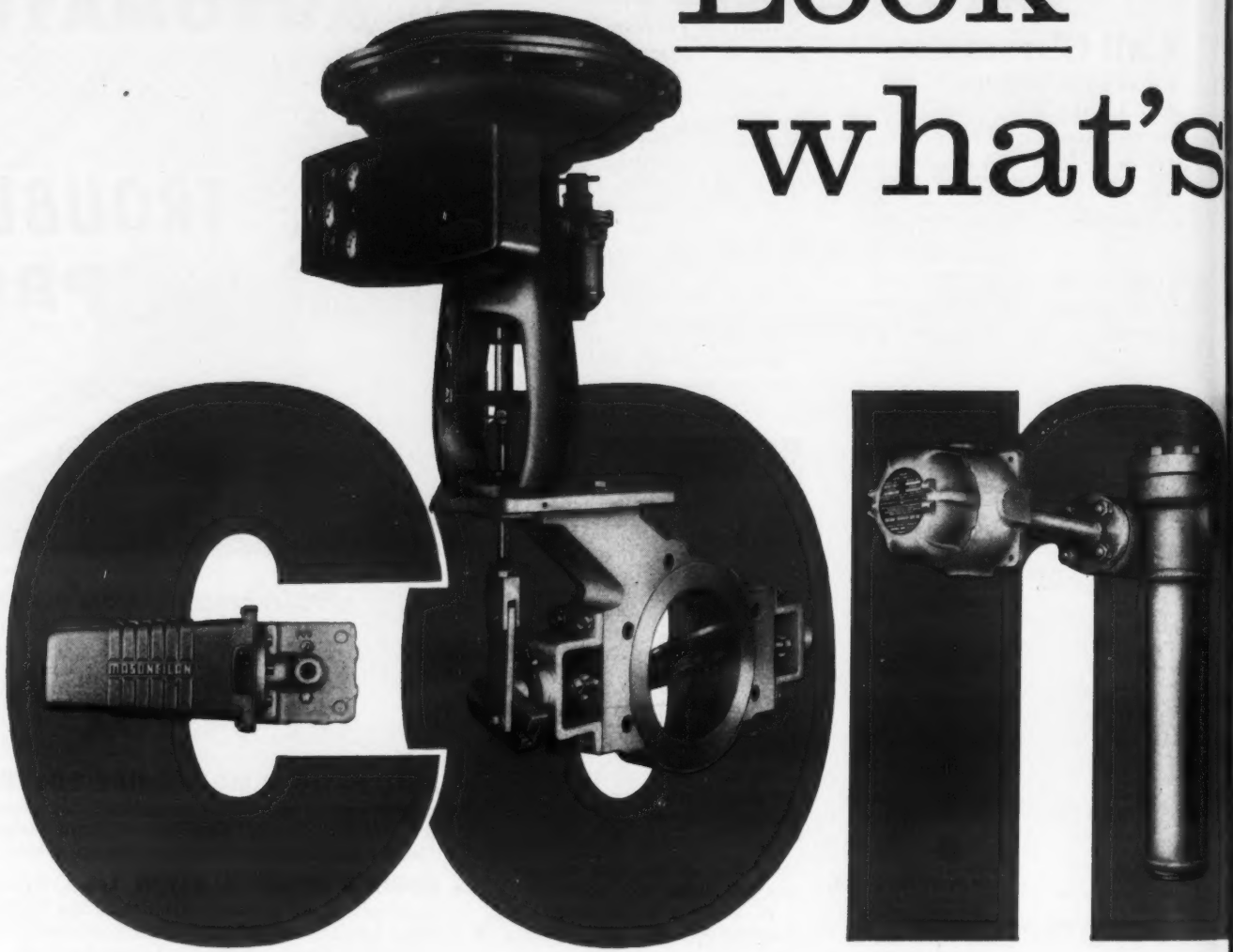
THE INTERNATIONAL BOILER WORKS CO.

880 Spruce St. East Stroudsburg, Pa.

Steel Firebox Heating & Power Boilers • Low & High Pressure Water Tube Package Boilers • International-LaMont Forced Recirculation Generators • ASME Code Pressure Vessels & Welded Products.

Check 1185 opposite last page

Look what's



C **New** Differential Pressure Transmitter combines rugged construction, accuracy, stability, compactness, lightweight.

O **New** Butterfly Valve line offers outstanding features which provide maximum strength, power, versatility and ease of maintenance.

n **New** Mechanical Level Switch provides simple means of indicating level; actuating alarms, solenoids and other devices.

t **New** Electropneumatic Transducer converts electric signal from controller to pneumatic output for operating final control element.

s New in

New Air Supply Valve — improved, low-cost, with built-in filter.

New Line of Temperature and Pressure Transmitters with high accuracy. Balanced beam permits mounting in any position without zero shift. Compact and lightweight.

New Level Transmitter using displacement type measuring element and strain gauge to transmit electric signal.

Get complete details on these and all other Masoneilan accurate, reliable process controls from our nearest representative, or write direct.

at

MASON-NEILAN

Division of Worthington Corporation

25 NAHATAN STREET, NORWOOD, MASSACHUSETTS

District Offices or Distributors in Principal Cities in U. S.

In Canada: at Brantford, Montreal, Toronto

For more information on product at left, specify 1186 see information request blank opposite last page.

Gardsman by WEST

TEMPERATURE CONTROLLERS

serve your need Best

General characteristics: indicating *and* providing positive control; distinctively simple, convenient, reliable, economical; tubeless; plug-in meter units; thermocouple break protected; guaranteed; demonstrated and serviced from offices in many cities here and abroad.

See us at the 13th Annual ISA Instrument-Automation Conference & Exhibit, Philadelphia, Pa. Sept. 15th-19th, Booth No. 1332

MODEL J SERIES

for Off-On control

MODEL JP SERIES

for Proportioning control; more precise where heating-cooling factors are more dynamic

MODEL JL SERIES

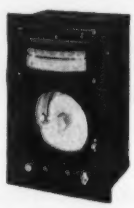
combines High Limit and Off-on control

MODEL JE SERIES

Portable—ideal for laboratories

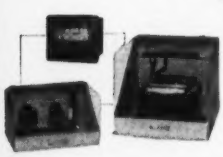
MODEL JG SERIES

provides Program control, applying any of above control actions to control both time and temperature.



MODEL JS SERIES

gives Stepless control; extremely precise



MODEL JT SERIES

gives 3-Position control for motorized valves, 3-phase heating, heating-cooling cycles

All controllers can be furnished for thermocouples or resistance bulbs. For data on these or other West instruments and accessories, use your classified phone directory or write direct.

the trend is to **WEST**

WEST Instrument CORPORATION

SALES OFFICES IN PRINCIPAL CITIES

4357C W. MONTROSE, CHICAGO 41, ILL.

British Plant: WEST INSTRUMENT LTD
52 Regent St. Brighton 1, Sussex
Represented in Canada by Upton, Brizzard & Jones

Check 1188 opposite last page

For all intents and purposes, analytical problems to be solved with production of a new drug at G. D. Searle and Co. could not be handled with usual methods or equipment. Indeed, by most methods the problems were impossible of solution . . .

WILLIAM CLARKE, Assistant Editor
with **DR. R. T. DILLON,** Head, Analytical Div.
G. D. Searle and Co., Chicago, Illinois

Problem: In analyzing — and thus controlling — production of a recently-introduced tranquilizer drug, a thiopropazate dihydrochloride sold under the trade mark Dartal, analytical group at G. D. Searle encountered a series of problems that could not be handled easily by usual analytical methods or equipment. Indeed, by most methods the problems were impossible of solution.

The material to be analyzed on a production line basis was a 2-chloro promazine derivative with an acetyl group on a side chain. This group very readily hydrolized to acetic acid with any trace of moisture. The material is also light sensitive, readily breaking down into other compounds upon excessive exposure to light. While this factor has no bearing on the de-acetylation problem, it complicated production matters.

Detection of deterioration of active ingredient in tablet manufacture had to be within a most narrow range, closer than the usual two to five percent accuracy attainable with many wet chemical methods.

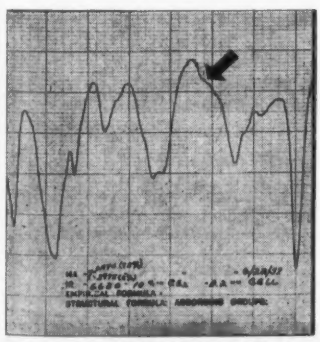
Yet accelerated aging tests, devised to measure rate of de-acetylation of drug in tablet

Dr. R. T. Dillon and spectroscopist A. Damascus watch automatic spectrophotometer record results of analysis on strip chart. Samples are run every five to ten minutes throughout the day

Checking results of an analysis at G. D. Searle's Spectroscopy Laboratory. Analysis is completed by comparing product in sample's curve with that of standard

infrared spectrophotometer detects impurities in tranquilizer with 2% accuracy

form, could only be interpreted intelligently if readings were possible to within one or two percent. Thus a few readings would serve not only to indicate aging results but trends.



Portion of infrared curve showing presence of five percent de-acetylated drug. Straight line at point (arrow) would indicate pure compound

Chemical determinations not only required a great amount of time, but the amount of material required for a necessarily long series of tests was prohibitive.

Chromatographic methods were impractical. Radioactive "tagging" required for this method did not appear to be particularly feasible.

In addition to the de-acetylation problem, source of 2-chloro promazine used in synthesis of the active drug could, because of method of preparation, also contain some 4-chloro promazine. Accordingly, detection of small amounts of the latter in the principal product was necessary.

Solution: Turning to infrared spectroscopy as the main analytical tool, analysts at G. D. Searle and Co. are now running six determinations an hour on Dartal brand

DEKORON PROTECTO-PAC

Advantages of Dekoron all-plastic instrument tubing harness are *now four-dimensional.* You get, in addition to its inherent lower-cost installation . . . chemical . . . impact . . . fire resistance.

And the advantages of Dekoron Protecto-Pac multiply the closer you examine them. For example, you can get Protecto-Pac in many forms to suit your requirements exactly — *from stock.*

If there is danger from weld splatter, sparks or a potential fire hazard — order Dekoron Protecto-Pac Type FB. If you wish to bury it underground — specify low-cost Protecto-Pac Type B. Both types supplied with virtually any number of individual tubes, and also with *new metal armor protection.*

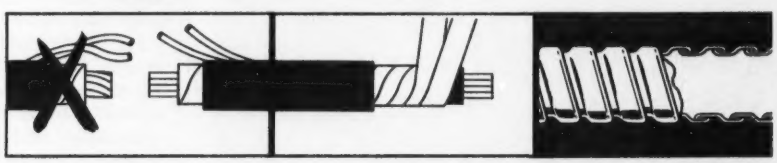
You can pay more but you can't buy better, longer-lasting instrument line harness than *Dekoron — America's Premier Instrument Tubing Line.*

AA-8386

TYPE FB FOR FIRE AND IMPACT RESISTANCE

FIRE RESISTANCE of copper tube bundles is superior up to 1900°F; less pronounced from 1900° to 2500°F. Above 2500° Protecto-Pac Type FB is superior to copper tube bundle.

TYPE B FOR UNDERGROUND BURIAL



NO "CORKSCREW" effect, as with twisted tubes, because tubes lie straight in bundle to give faster, neater individual tube take-offs.

NEW IMPROVED INSULATION is composed of two wraps of asbestos tape bonded to backing of Mylar® for maximum protection.

DEKORON PROTECTO-PAC Type FB or Type B can be supplied with 24 gauge galvanized steel armor of modified square-lock construction with cord packing for maximum strength and flexibility.

Dekoron® products QUALITY • RESEARCH • SERVICE

SAMUEL MOORE & COMPANY • DEKORON PRODUCTS DIVISION • MANTUA, OHIO

Check 1189 opposite last page

(Trade Mark) tranquilizers and other materials. Analyses of known mixtures are used as standards. Simple comparisons of curves made by spectrophotometer reveal presence or absence of desired groups.

Spectrophotometer Selected

Infrared spectrophotometer chosen is an automatic recording instrument of double-beam double monochromator design. Operation is by push-button. The recorded spectrum is visible at all times as it travels horizontally across face of instrument.

Scanning speed is such that the whole 1-15 micron range can be run in as little as three minutes or as long as 12 hours. Small selected portions can be scanned in a minute or two. Where desired, a pre-selected scanning schedule can be utilized to considerable advantage. Normal wavelength expansion is two inches per micron, and this can be varied with simple quick-interchange gears.

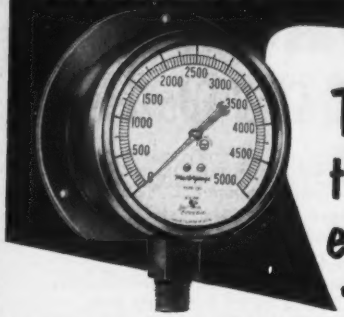
Operation of the instrument is relatively easy. Once the equipment has been set and calibrated by an analyst, the instrument can be operated by a technician. The spectrophotometer not only runs the curve unattended, but stops automatically at the next starting point for the next run. The operator then tears off the completed section of the preprinted 1-16 μ strip chart paper and the unit is then ready for the next run.

For short runs, there is also a STOP button. The wavelength may be indexed rapidly with a manual control.

Results: Since introduction of the Dartal brand (Trade Mark) tranquilizer by G. D. Searle and Co. in December, 1957, every lot of thiopropazate dihydrochloride produced has been analyzed completely by infrared. An entire scan has been done of each production batch to insure purity and absence of de-acetylated material.

Use of spectrophotometer has been so successful that shortly after the one instrument had been purchased and installed, another unit was

MARSH *Mastergauge*



The gauge that has everything!

- **LEAK-PROOF ONE-PIECE CONSTRUCTION** . . . bourdon tube fused to socket and tip by exclusive "Conoweld" process.
- **STURDY "MARSHALLOY" CASE** . . . formed of boiler-plate-thickness steel, copper clad inside and outside to give it the corrosion resistance of solid copper. It's one third lighter, but four times stronger than cast iron.
- **PRECISION "MASTERGAUGE" MOVEMENT** . . . with such exclusive features as the coined sector gear.
- **AVAILABLE WITH STAINLESS TUBE AND SOCKET** . . . choice of stainless steels and alloys for all corrosive conditions.
- **WITH "RECALIBRATOR"** . . . quickest and best way to keep a gauge accurate.

These features are combined only in "Mastergauge", standard bearer for the broad line of Marsh Gauges . . . each the best of its kind. Ask for data.

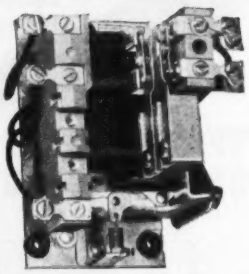
MARSH "THE STANDARD OF ACCURACY"

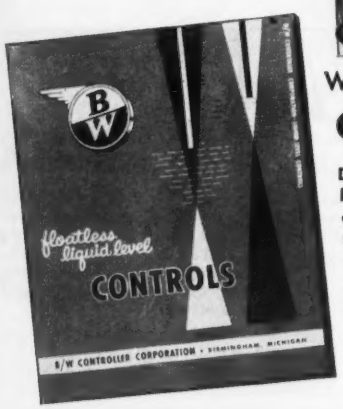
MARSH INSTRUMENT CO., *Sales Affiliate of Jas. P. Marsh Corp.*, Dept. Z. Skokie, Ill.
Marsh Instrument and Valve Co. (Canada) Ltd. 8407 103rd St., Edmonton, Alberta.
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas.

Check 1190 opposite last page

LIQUID LEVEL CONTROL

● Accurate! Automatic! No floats! No moving parts in liquid. Pioneered by B/W in 1933. Controls not affected by temperatures, pressures, acids, or caustics. Remote control if desired. Ice free electrodes when necessary.





WRITE for NEW **CATALOG**

Describes liquid level relays, electrodes, signals, alarms and alternators. Complete descriptions, charts and diagrams. Shows panels for liquid level and industrial controls. Full of valuable information . . . Write, wire or phone.

B/W CONTROLLER CORPORATION

2204 East Maple Road, Birmingham, Michigan

Check 1191 opposite last page

SHOCK-PROOF . . . VIBRATION-PROOF
BROOKS MAG/NA/LARM*

instantaneous signalling of high or low flow

Used with Brooks Full-View* and Ar-Met* rotameters, the Mag/Na/Larm is readily adaptable to a variety of flow alarm and simple control functions.

The unit operates directly from a magnetic metering float extension . . . has four individually adjustable alarm points that can be set anywhere along the range.

Engineered for the utmost reliability, the Mag/Na/Larm incorporates fail-safe relay circuits and hermetically-sealed magnetic switches.

Mag/Na/Larm has been designed for use with interchangeable metering elements. That's why when you buy Brooks, you buy for today's needs . . . and tomorrow's possibilities.

Write for Bulletin 165

*Trademarks

BROOKS ROTAMETER COMPANY
958 A STREET,
LANSDALE, PA.

S.A. 1699

Check 1192 opposite last page

King MANOMETERS

Every Size — for Every Service

U-Type Manometers
- Single Cleanout
- Single Gland-Packed
- Double Cleanout
- Double Gland-Packed
- High Pressure

Low in price, Trouble-free, Easy to install and read

Well-Type Manometers
- Low Well
- Raised Well
- Barometric Reading

Stay clean longer, Easy to service

Multi-Tube Manometers
- Multi-Well
- Common-Well
- Special-Purpose

FREE LITERATURE gives sizes, construction and prices. Write today! And ask for informative 12-page Manual on Manometers.

KING ENGINEERING PRODUCTS include King-Gages — Manometers — Self-Closing Push Valves — Pressure Transmitters — Sight Feed Bubblers — Overflow Check Valves — Air-flow Snubbers — Sediment Traps — Moisture Indicators

KING ENGINEERING CORP.
Box 270 • Ann Arbor, Mich.
REPRESENTATIVES IN PRINCIPAL CITIES

Check 1193 opposite last page

Protects Metals Against Hot Acids, Acid and Sulfurous Fumes, Salt Spray Steam, Mild Alkalies Up to 600° F.

Markal "D-A" Coatings will protect metal against any corrosive action. It is an ideal product for ore sintering plants, plating plants, food plants, lumber kilns, foundries, chemical plants, sewage disposal plants, laundries, heat exchangers . . . many others.

Markal "D-A" Coatings are applied by brush or spray and can be air dried or baked. The Coatings will withstand temperatures up to 600°F.

For free sample write on company letterhead, stating temperature extremes, surface temperature at time of application, and corrosive condition.

Other Markal Coatings are available in a complete range of types for any condition and temperatures up to 2200°F. Send for catalog No. MPC. The **Markal Company,** 3055 West Carroll Avenue, Chicago 12, Illinois, telephone Sacramento 2-6085

Check 1194 opposite last page

What's A "New Solution?"

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

bought for additional control work.

Although the instrument, of necessity, must be considered as involving only one phase of control work, use of the infrared unit has been most valuable. The equipment has permitted analyses — quickly and easily — that very possibly could not have been done in any other manner.

(IR-4 infrared spectrophotometer is product of Scientific Instruments Division, Beckman Instruments, Inc., 2500 Fullerton Road, Fullerton, California.)

Check 1195 opposite last page.

Recorder handles four non-linear inputs on one chart

Uses: As electronic recorder for any four process variables, linear or non-linear, plus flow integration.

Features: Recorder can handle as many as four non-linear inputs on the same chart.

Description: Two different electronic receivers can be used with recorder. One is a differential transformer unit used in conjunction with a number of manufacturer's standard transmitters. These transmitters are used for pressure, temperature, flow, liquid level, or a specified input motion. Second receiver is a slide wire, also with cam, used in AC resistance bridge measurement as well as DC potentiometer circuitry.

Voltage source is designed for stability. Only a $\pm 0.05\%$ variation for $\pm 20\%$ supply voltage fluctuation is said to occur. Standard cell or dry cell batteries are not used. Device contains no electronic tubes.

Pneumatic transmitters and pneumatic control of three standard modes and combinations are available. These are actuated by either of the two electronic receivers.

(Universal Electronic Recorder 771 is product of The Hays Corp., Michigan City, Ind.)

Check 1196 opposite last page.

WHEN THERE'S
METERING
ON THE MOON...
BARTON METERS will be there with the required precision and quality for dependable performance and easy maintenance.
Barton Instruments have a wide field of application in Instrumentation and Automation where the measurement of FLOW, LIQUID LEVEL and DIFFERENTIAL PRESSURE is required. Ranges are from 0-20" W.C. to 400 psi with safe working pressures to 6000 psi.
You are cordially invited to visit our booth No. IT39 at the ISA Show, Philadelphia, Pa., Sept. 15 thru 19th
MODEL 199 METER BODY
MODEL 700 INDICATOR
MODEL 238 TRANSMITTER
MODEL 226 INDICATOR
MODEL 238 FLOW SWITCH
MODEL 237 CONTROLLER
BARTON INSTRUMENT CORPORATION
580 MONTEREY PASS ROAD, MONTEREY PARK, CALIFORNIA
Representatives in principal cities in the U.S.A. and all over the world

Check 1197 opposite last page

High strength tape is easily punched, also flexible

Will not stretch during use; is economical

Uses: As control tape for automatic programming equipment such as electronic typing calculators and automated machinery.

Features: Cellulose plastic tape combines high tensile and bending strength with flexibility. It is said that tape will not stretch out of shape during use.

Description: Control tape is a smooth 0.005 inch thick slate-gray vulcanized fibre. Tensile strength is better than 6000 psi. It has high density, low porosity, excellent abrasion resistance and is easily punched.

Cost-wise, this tape falls between paper and polyester film. Estimated maximum life is 1,000,000 cycles while paper, at half the cost, has an estimated maximum life of 10,000 cycles.

(Peerless control tape is product of National Vulcanized Fibre Co., 1058 Beech St., Wilmington 99, Del.)

Check 1198 opposite last page.

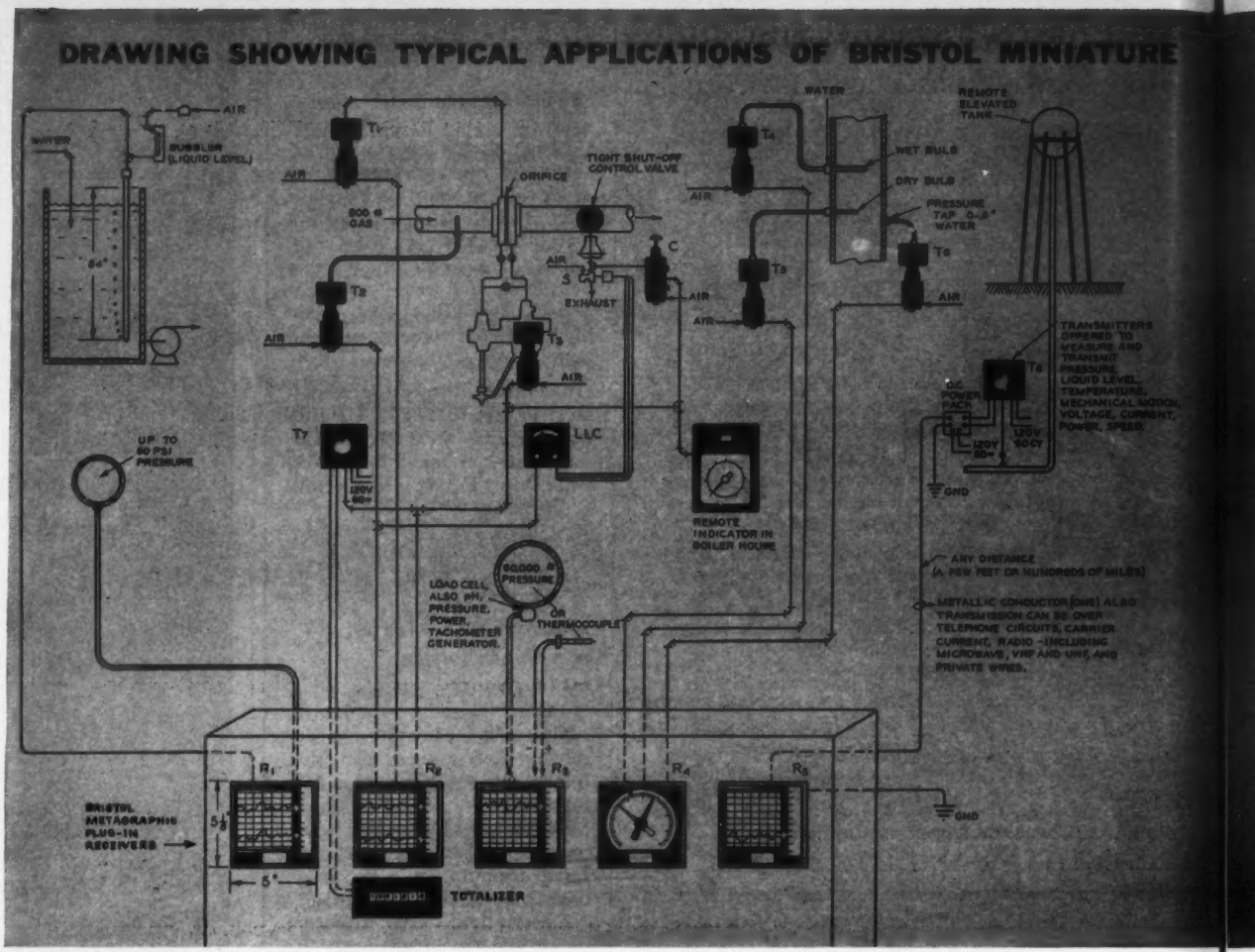
External float control handles 40° Bé nitric with safety

Acid is delivered to tank under pressure

Problem: Nitric acid — 40° Bé — is delivered under pressure from a storage tank at International Nickel Company's Huntington, W. Va. Works to measuring tank before "pickling" operations.

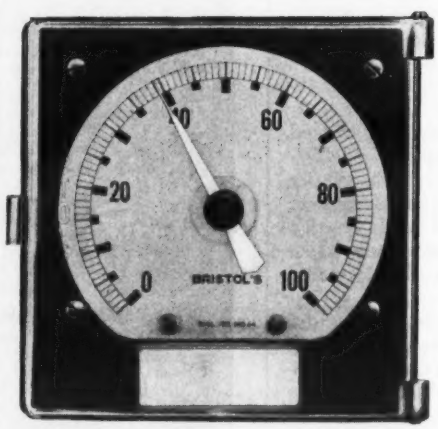
Operator manually controls filling, watching a prismatic gage glass. But operator's attention may wander or his vision may be obscured. For safety reasons, it was desired to install an automatic shut-off should the acid level in the tank become too high.

Solution: After consideration of a number of different types of level controls, an external-float controller was in-


DRAWING SHOWING TYPICAL APPLICATIONS OF BRISTOL MINIATURE
AIR
WATER
BUBBLER (LIQUID LEVEL)
ORIFICE
TIGHT SHUT-OFF CONTROL VALVE
EXHAUST
WET BULB
DRY BULB
REMOTE ELEVATED TANK
TRANSMITTERS OFFERED TO MEASURE AND TRANSMIT PRESSURE, LIQUID LEVEL, TEMPERATURE, MECHANICAL MOTION, VOLTAGE, CURRENT, POWER, SPEED
UP TO 60 PSI PRESSURE
LLC
REMOTE INDICATOR IN BOILER HOUSE
LOAD CELL ALSO pH, PRESSURE, POWER, TACHOMETER GENERATOR
OR THERMOCOUPLE
ANY DISTANCE (A FEW FEET OR HUNDREDS OF MILES)
METALLIC CONDUCTOR (ONE) ALSO TRANSMISSION CAN BE OVER TELEPHONE CIRCUITS, CARRIER CURRENT, RADIO (INCLUDING MICROWAVE, VHF AND UHF) AND PRIVATE WIRES.
BRISTOL METAGRAPHIC PLUG-IN RECEIVERS
TOTALIZER
GND

ALL RECEIVERS LOOK ALIKE ON GRAPHIC PANEL, and all take the same panel cutout (4 9/16″ sq.)

Bristol offers: More types of miniatures



BRISTOL METAGRAPHIC INDICATORS feature easy-to-read 9-inch effective length scale and interchangeability with recorders of same type.

Bristol Miniature Instrument Systems offer broadest measurement range and widest process control coverage:

- ***Pneumatic Transmission***
- ***Electronic Potentiometers and Bridges***
- ***Telemetering Instruments***
- ***Recording Gauges***

Automatically Controlling, Recording, and Indicating Models

INSTRUMENT SYSTEMS

LEGEND

BRISTOL* METAGRAPHIC TRANSMITTERS

T_1 Pressure
T_2 Temperature
T_3 Differential Pressure or Flow
T_4 Temperature (Wet Bulb)
T_5 Temperature (Dry Bulb)
T_6 Pressure (as low as 0 to 5 mm mercury)
T_7 Integrator
T_8 Liquid Level Metameter Telemeter

*Metagraphic Transmitters are available for temperature, pressure, vacuum, differential pressure, flow, liquid level, mechanical motion, and through the use of the Bristol Dynamaster† Electronic Transmitter any input signal in the form of voltage, current, or change of resistance, capacitance, or inductance such as pH, speed, strain, density, etc.

BRISTOL RECEIVERS

R_1 Pressure or/and Liquid Level Recorder
R_2 Metagraphic Recorder (up to 2 records and 1 indicator)
R_3 Dynamaster Electronic Potentiometer or Bridge
R_4 Metagraphic Indicator—one, two, or three pointers for wide range of measurements or two pointers and one manual remote control.
R_5 Metameter† Telemeter

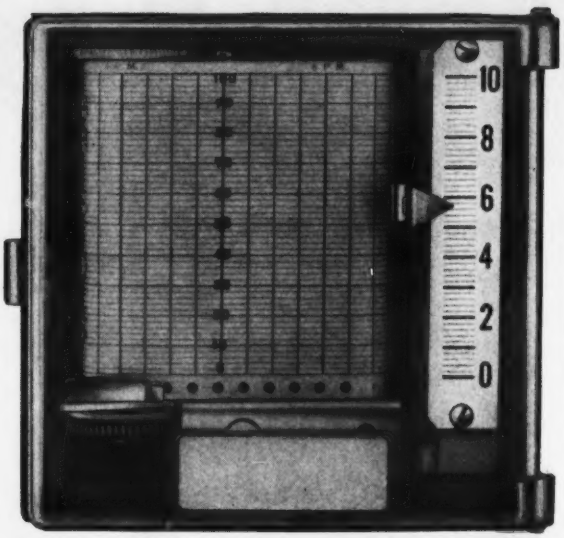
†T.M. Reg. U.S. Pat. Off.

BRISTOL METAGRAPHIC CONTROLLERS

(36 models to choose from—by far widest variety available)

Five Modes of Control

1. On-Off (Fixed High-Gain)
2. Proportional (Adjustable Gain)
3. Proportional-plus-Reset
4. Fixed-Proportional plus Fast-Reset
5. Proportional-plus-Reset-plus Derivative



BRISTOL METAGRAPHIC MINIATURE RECORDERS—whether electronic, pneumatic, telemetering, or gauge types—present a uniform, pleasing easy-to-read panel appearance, measure only 5" x 5 1/8", fit same 4 9/16" square panel cutout.

than any other instrument company

...plus a complete line of full-sized instruments

Bristol makes them all. Whatever your choice in instruments, you need look no farther than the complete Bristol line—pneumatic, electronic, miniature telemeters and gauges—all in a *planned* line.

Planned to give graphic panel installations a neat, pleasing, matching appearance.

Planned to give you the widest possible measurement range, the broadest instrument coverage, of any line.

Planned to free you from costly pre-installation decisions as far as practically possible—true plug-in instruments; widest practical number of instrument substitutions; easiest, fastest range changes.

Planned to give you any type of instrumentation—electronic, pneumatic or mixed systems in plug-in miniature construction.

Planned to give you the results of modern human-engineering studies in chart, dial, and indicator visibility and readability.

Bristol makes all types, all sizes of instruments, can give you all control modes. That's why Bristol application engineers don't need to shade the facts. When they make an instrument recommendation it's based on our unbiased consideration of *your* problem alone.

Write for complete technical data on Bristol miniature instruments today. The Bristol Company, 141 Bristol Road, Waterbury 20, Conn. B-6

BRISTOL *TRAIL-BLAZERS IN PROCESS AUTOMATION*

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 1199 opposite last page

Any possibility of over-flow from nitric acid measuring tank is prevented by external float level control (arrow)

stalled. Selection of instrument was made on the basis that it was simple in action, easy to install, and designed to operate for long periods of time without maintenance, or external power sources.

Level controller is completely self-contained and is made of 304 stainless steel. Action is based on a magnetic switch actuated by a sliding magnetic sleeve which acts through a non-magnetic enclosing tube. Float chamber is mounted externally to the stainless tank.

Results: Since installation of the magnetic level control approximately four years ago, the extremely high reliability and consequent safety in the action of the instrument has caused engineers to specify the same controller for similar installations. Maintenance has been practically nil.

(Magnetrol Model 751 is product of Magnetrol, Inc., 2110 South Marshall Blvd., Chicago 23, Ill.)

Check 1200 opposite last page.

Next month . . .

'BUILD NOW!'

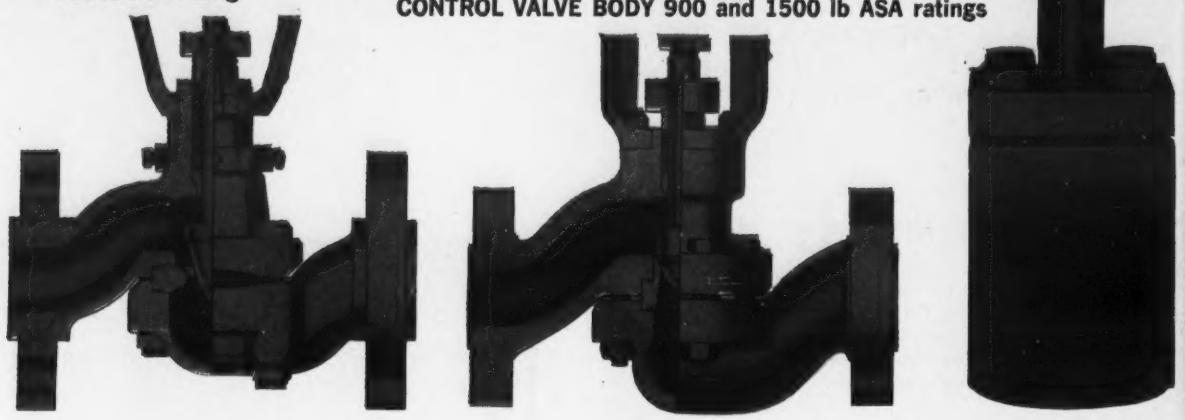
exclusive CP report

In October CP, major contracting firms and chemical companies point out solid reasons for building **now.** Exclusive report skirts generalities and platitudes, gets down to facts and figures, dollars and sense, which leave no doubt about the wisdom of going ahead with expansion without delay.

MOLTEN METAL VALVE BODY

CONTROL VALVE BODY
600 lb ASA rating

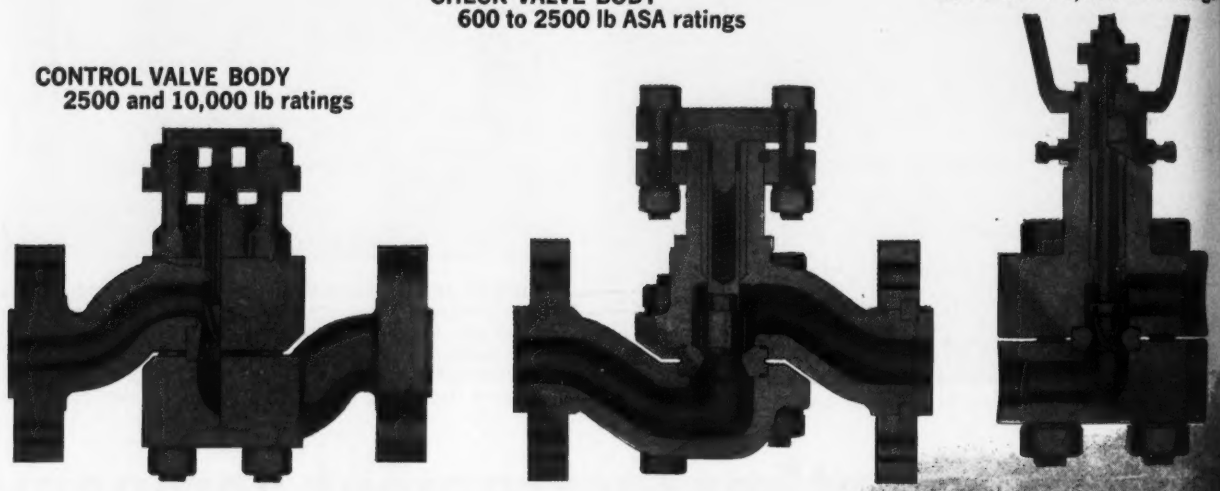
CONTROL VALVE BODY 900 and 1500 lb ASA ratings



CONTROL VALVE BODY
2500 and 10,000 lb ratings

CHECK VALVE BODY
600 to 2500 lb ASA ratings

CONTROL VALVE BODY
2500 and 10,000 lb ratings



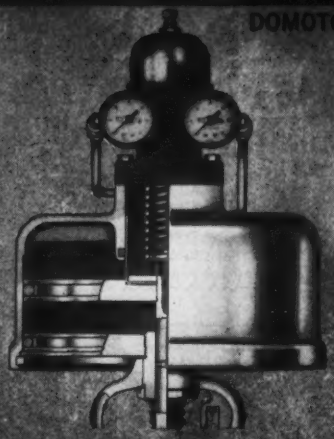
In all the world of process control
there is no better valve design
for function and reliability

THE *Annin*

1040 SOUTH VAIL AVENUE, MONTEBELLO, CALIFORNIA

SEE ANNIN VALVES ON DISPLAY AT THE 13TH ANNUAL ISA INSTRUMENT

DOMOTOR OPERATOR

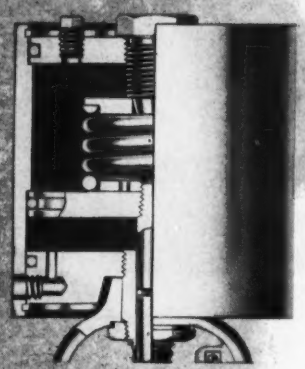


GOAL.....

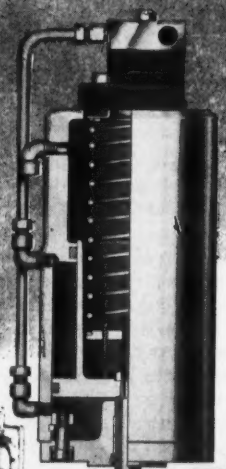
CONTROL?

ELECTRO-PNEUMATIC DOMOTOR OPERATOR

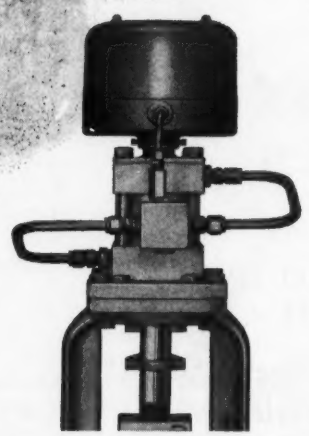
ANNIN VALVE BODIES AND OPERATORS



CYLINDER OPERATOR



PNEUMATIC-HYDRAULIC OPERATOR



ELECTRO-HYDRAULIC OPERATOR

COMPANY

DIVISION OF THE ANNIN CORPORATION

STROKE POSITIONING OPERATOR

For more information on product at left, specify 1201 see information request blank opposite last page.

AUTOMATION CONFERENCE AND EXHIBIT, SEPTEMBER 15-19, PHILADELPHIA, PA.

ACCURATELY MEASURES LIQUIDS from *ACETONE* to *ASPHALT*

PETROMETER Remote Reading LIQUID LEVEL INDICATORS are accurate and reliable. Suitable for all stored industrial liquids . . in any tank . . . at any distance. Easy to install . . . and easy to read. Indicators have many unique design features.

write today for Bulletin 6004.

PETROMETER
CORPORATION
43-22 TENTH ST. LONG ISLAND CITY 1, N. Y.

Check 1202 opposite last page

ELECTRONICS-TIME
Lumenite

AUTOMATIC CONTROLS

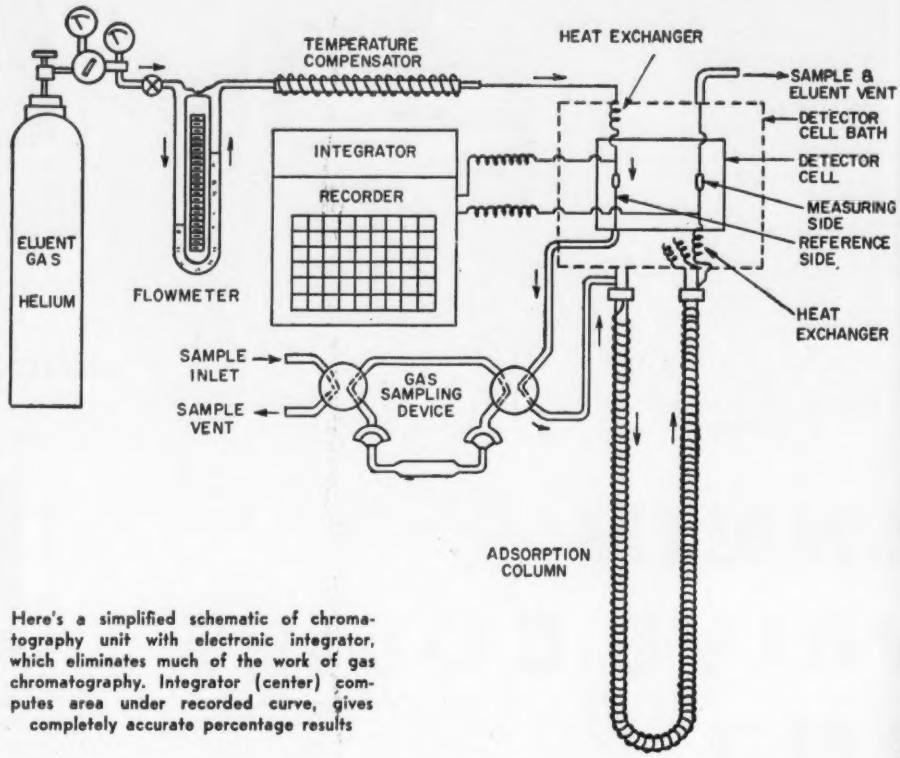
- *ELECTRONIC LIQUID LEVEL*
- *INDUSTRIAL TIMERS*
- *TIME SWITCHES*
- *MAGNETIC SWITCHES*
- *ELECTRONIC SWITCHES*

For Complete Information and Prices on Equipment Needed Write For Any Bulletin Listed Below.

LT—Time Switches FL—Liquid Level ITC—Ice Thickness
PC—Program Clocks FM—Milk Level BH—Boiler Level
CR—Cycle Repeaters FN—Nonconductive Liquid MV—Motorized Sanitary Valves
R—Time Delay Relay RMC—Automatic Reset IT—Interval Timers
LAS—Auto-Lawn Sprinklers LEE—Photo-electronic Relays-Counters, etc.

LUMENITE ELECTRONIC CO.
ENGINEERS • DESIGNERS • MANUFACTURERS
407 South Dearborn Street Chicago 5, Illinois

Check 1203 opposite last page



Here's a simplified schematic of chromatography unit with electronic integrator, which eliminates much of the work of gas chromatography. Integrator (center) computes area under recorded curve, gives completely accurate percentage results

Instrumentation increases efficiency in gas chromatography

EDWARD PASCH, Applications Engineer
Wheelco Instruments Division
Barber-Colman Company
Rockford, Illinois

Although gas chromatography doesn't provide any answers not obtainable in other ways, it does provide fast accurate analysis of individual components of a gas at a lower cost than is possible with other forms of instrumentation. And two recently-developed instruments are increasing the efficient application of gas chromatography.

Basic elements required for a chromatography unit are a carrier gas supply, the column, the detector cell, a recorder, and accessories.

Carrier gas, usually helium, is fed into a flow meter at approximately 20 ml per minute. The gas is then fed into a two-sided cell in which the first or reference side contains a measuring element. The gas then passes through the column with the sample being analyzed.

After leaving the column, the flow again enters the cell on the second or measuring side. A voltage balance is developed betwen the two sides of the cell. This voltage corresponds to zero input on the recorder.

Different Cells Used

Thermal conductivity cells work from a controlled voltage and current applied to both reference and measuring sides. The voltage differential between the two provides the signal to the recorder. Operation of the thermistor cell is basically the same except a change in thermal

conductivity of the gas provides a signal. A third method uses two thermocouples wired so that one opposes the output of the other, the difference providing the signal. Still another method uses ionization cells. These will add further to the range of effective applications for gas chromatography.

Precise Temperature Control

In most chromatography equipment, precise temperature control of the cell block and column must be attained quickly and without overshoot. One of the latest developments is a simple unit that is accurate to 1/10°C in an ambient temperature to 300°C. The unit uses a saturable core reactor that provides rapid heating and sharp cutoff — because the circuit goes into resonance within 4% of cutoff and no power comes out.

There's nothing complicated about the installation. The package includes platinum probes with a resistance change of 0.3 ohms/degree C, a helipot dual dial, a 15 turn blind controller, a relay with contacts for the flash heater, a magnetic amplifier, and a saturable reactor.

Electronic Integrator

Second development increasing efficiency of gas chromatography is an electronic integrator. Until this instrument became available, the area under each peak on the recorder chart had to be measured. This was done manually with a planimeter or using integral calculus.

Now, recorder and integrator compute the area under the curve and give completely accurate percentage results. It is only necessary to count pips which have been recorded on the right hand side of the chart.

The electronic integrator is a little more complicated than the temperature controller. As the chart moves on the recorder, the integrator converts the position of the recorder

To page 138

YOU CAN SAVE
time, labor and money
BY CONVERTING
your hand-operated valves...

TO LimiTorque

Trouble-Free
Motorized Valve Operation

Why not be modern and thrifty too—follow the example of hundreds of plants of all types. *Convert* your present hand-operated valves to LimiTorque "push-button control"—*save time, labor and money.*

In most instances, LimiTorque conversion requires only minor changes to the valve. Your LimiTorque Valve Operators can be furnished as a completely packaged unit including electrical controls and push button. Simply wire the power leads to your source of electricity.

With LimiTorque, one finger does the work of many hands, by permitting key personnel to operate, and know the exact position of each valve from a centrally located control panel.

In addition, LimiTorque protects seats, discs and stems from damage, by automatically shutting-off power source should an obstruction interfere with valve closing. LimiTorque-operated valves are always seated tightly because the valve disc seating thrust is accurately maintained in each closing-cycle, through a micrometer-adjusted torque limiting mechanism.

See us at Booth 843 I.S.A. Show

LimiTorque controls can be field-mounted on existing valves of all types . . . contact your valve manufacturer or nearest LimiTorque sales-engineering office.

Send for Catalog L-550, . . . and please use your Business Letterhead when requesting a copy.

THERE IS NO SUBSTITUTE FOR —
LimiTorque®

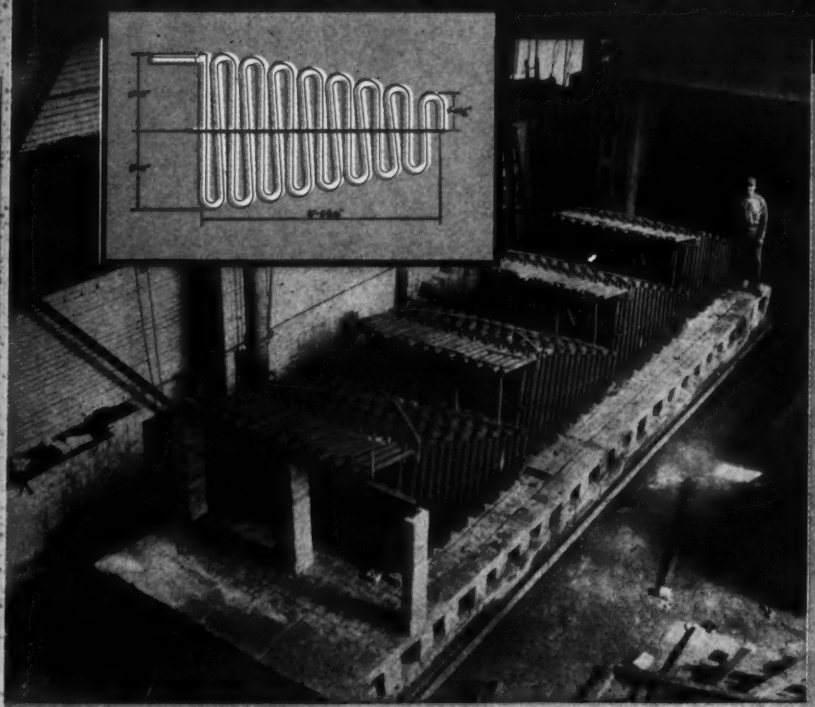
PHILADELPHIA GEAR CORPORATION
ERIE AVE. & G STREET, PHILADELPHIA 34, PENNA.
Offices in all Principal Cities

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID AGITATORS • FLEXIBLE COUPLINGS
Limitorque Corporation • Philadelphia

Check 1204 opposite last page

MIDWEST PIPE COILS

Meet the MOST EXACTING Specifications



FULL FURNACE ANNEAL

Furnaces of giant size enable us to anneal large coils under closely controlled conditions. Shown here is set of 48 kiln cooling coils 2½" OD x .165" wall bent on 6" centers with maximum reduction of ½" on OD. Material is 7% Cr—½% Mo.

Do you need coils

- . . . that are full furnace annealed
- . . . of intricate design
- . . . to comply with codes
- . . . with bends to close centers
- . . . to accurate dimensions
- . . . made of stainless steel or other corrosion resistant or heat resistant pipe?

We make coils of any size, shape or contour . . . of any pipe which can be bent and welded. Equipment includes the most modern bending and coiling machines . . . furnaces large enough for full furnace anneal. Welding and coiling techniques are the most advanced, developed through long experience.

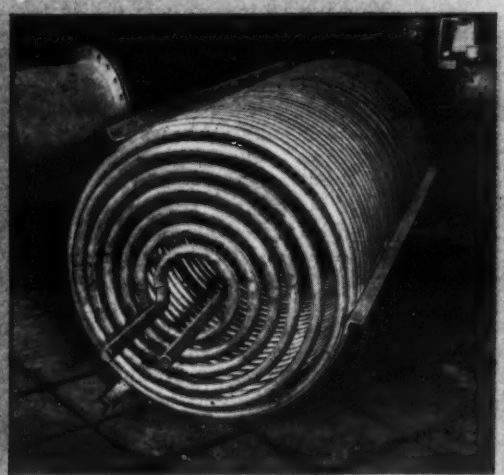
Here are just a few of the types of coils we make regularly. Send us your specifications.

DOUBLE COIL

Diameter of inside coil is only 8" while outside is 14". Made of 1¾" OD x 1¼" ID 4-6% Cr—½% Mo tubing and full furnace annealed.

304 STAINLESS-SANITARY FINISH

Double cylindrical coil of 3" OD by 14 gauge, Type 304 stainless steel. All welds ground to sanitary finish.



KETTLE COIL

Made of 1" Schedule 40—316 ELC. Finished coil was heated to 1950°F and water quenched.

7677

SALES OFFICES:
Asheville (Box 446, Skyland, N.C.) • Atlanta 9—721 10th N.E.
Boston 27—426 First St. • Chicago 3—79 West Monroe St.
Cleveland 14—616 St. Clair • Houston 2—1213 Capitol
Los Angeles 33—520 Anderson • Miami 34—2103 Le Jeune
New York 7—50 Church St. • Pittsburgh 19, Pa.—437 Grant
San Francisco 11—420 Market St.
St. Louis 4, Mo.—1450 South Second St.
Tulsa—1640 East 21st St.
STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

DO YOU WANT . . .

additional information on any of the products or services mentioned in this issue of CHEMICAL PROCESSING?

Then make use of the Reader Service slip opposite the last page of this issue.

It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story or ad, just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

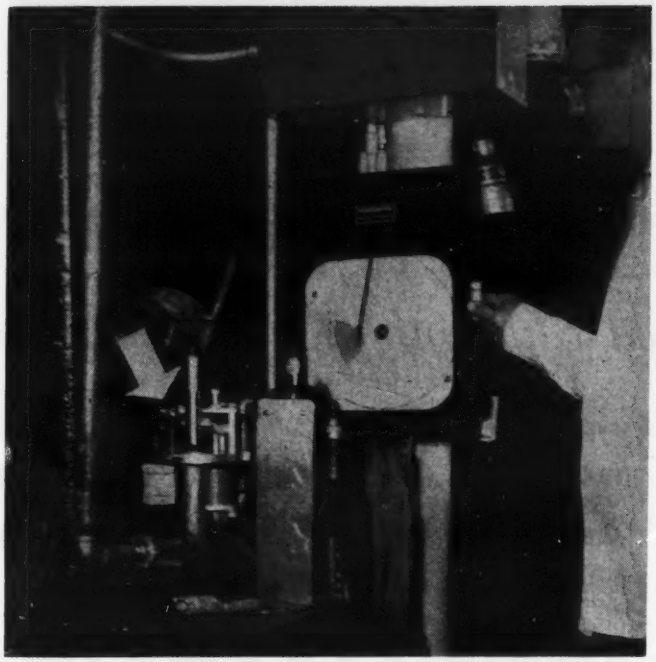
Additional details will be sent direct to you.

Be sure . . .

to fill in the slip with the other pertinent information: your name, title, company, product made, address.

For more information on product at left, specify 1205 see information request blank opposite last page.

PROCESS INSTRUMENTATION and LABORATORY APPARATUS
. . . Fourth Annual Feature



Chemist Clifford Voigt inspects record of the viscosity determinations over a period of the past two hours. Cover has been removed from viscosity control instrument (arrow)

- **Reduces product waste and labor costs**
- **Automatically controls process**

Viscometer assures uniform control in varnish preparation

WILLIAM CLARKE, Assistant Editor
with **CLIFFORD VOIGT,** Chemist
Transo Envelope Company

Problem: Failure to achieve control of viscosity at Transo Envelope Company in Chicago, Illinois was resulting in off-specification varnish which, in turn, was causing paper waste and increased labor costs.

For many years, viscosity of varnish used for window envelopes had been the particular care of the Envelope Department foreman. "Grab" samples were taken intermittently and heated in a water bath to a temperature of 100°F. Then a viscosity reading was taken by comparing bubble travel with a series of standards.

Unless the sample was allowed to remain in the water bath the proper time, an incorrect reading would be taken. Further complicating factor was that a solvent was constantly being added to the varnish to overcome evaporation losses. Whenever foreman completed a viscosity reading, he would adjust solvent addition according to viscosity test. Any test error was there-

What's your tubing problem?
Corrosive Liquids or Gases?
High Temperatures (up to 500°F.)?
Low Temperatures (down to —450°F.)?
Flexibility?
Solve them with "Temprex" Teflon* Tubing

Hitemp Wires, Inc., pioneer in Teflon, now offers you a complete line of flexible tubing for chemical, petroleum, medical, hydraulic and other applications.

Dependable service in the exacting aircraft, missile and nuclear energy fields is the best proof of performance. "TEMPREX" Tubing's long life saves you money... by minimizing replacements and costly down time.

"TEMPREX" Tubing is manufactured on the industry's most modern equipment... to strictest tolerances... your assurance of consistent high quality and reliability.

Advantages of "Temprex" Tubing

Unaffected by: All known solvents, All known lubricants, Sunlight, Outdoor weathering
Resists: Corrosion, Fungus

High Tensile Strength: Average 1500 psi
Lowest Coefficient of Friction of any known material
Zero Water Absorption (ASTM Test #D570-42)
Flexible throughout service temperature range (—450°F. to +500°F.)
Excellent dielectric strength and insulation resistance

Get full details today on "TEMPREX" Tubing, in 12 colors and natural... as well as Bondable Tubing. For specifications, sizes, wall thicknesses — plus complete data on our extensive facilities — write Department 1051, 1200 Shames Drive, Westbury, L. I., N.Y.

**DuPont's Trade Name for Tetrafluoroethylene*

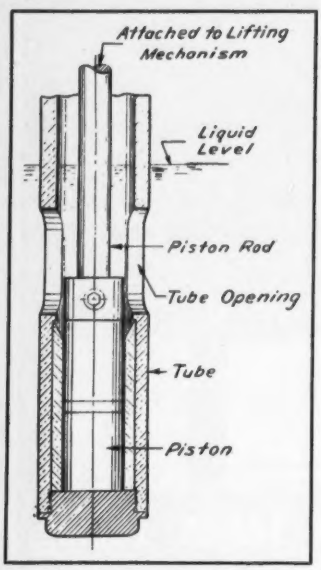
HITEMP WIRES, INC.

Check 1206 opposite last page

fore compounded.

Solution: Early in 1957 Transo installed an automatic viscometer and recorder to maintain a tighter control of varnish viscosity.

Every two minutes the viscometer checks the viscosity of the varnish in the make-up tank and records the reading. If viscosity is too high, a solenoid valve in solvent line controlled by viscometer replenishes solvent. A needle valve in series on the solvent line



Viscosity is determined by time required for piston to fall. Sample enters through tube opening

can be adjusted to prevent overrun. However, point of solvent addition has been located so as to be close to automatic sampling device of viscometer. A mixer constantly agitates the mixture.

Viscometer operates on falling piston principle. A piston assembly, as shown in illustration, is periodically raised by a lifting mechanism, thus drawing a sample into the measuring tube. The sample goes down through the clearance between the piston and the inside of the tube into the space formed below the piston as it is raised. This assembly is then allowed to fall by gravity, expelling the sample out through the same path as it entered.

Time of fall is a measure of the viscosity, with the clear-

SEE THE NEWEST AT

Taylor Instrument Companies will present an Advanced Showing of a new line of

ELECTRONIC INSTRUMENTS

as well as the latest advancements in pneumatic instrumentation

...at the ISA

Taylor Instruments

THE TAYLOR BOOTHS

The new line embodies the latest concept in electronic instrument design, while incorporating many time-proven convenience features originated by Taylor, such as front adjustment, plug-in components and truly rectilinear charts.

Also the TRANSCOPE* Controller and Recorder — pace setters in the pneumatic field — mark a giant step forward in compactness, convenience and performance.

Plus the SENSAIRE* Temperature Transmitter — hailed as an outstanding development in more economical pneumatic instrumentation.

Key representatives from our Application Engineering and Sales Departments will be on hand at the Show to counsel you with your instrumentation problems. And if you have branch plants overseas, you will be interested to learn of Taylor's recently expanded facilities — and our plans for further expansion.

Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

*Trade-Mark

Show, Booths 916 and 1017

VISION • INGENUITY • DEPENDABILITY

MEAN ACCURACY FIRST

Check 1207 opposite last page

ance between the piston and the inside of the tube forming the measuring orifice.

Importance of Test

Critical phase of processing paper in manufacturing of window envelopes is maintenance of proper varnish viscosity. Variation in viscosity alters application on paper.

During the manufacture of envelopes, the paper is impregnated with this specially formulated varnish. (The paper is also specially manufactured to minimize causes for opaqueness.) Once the varnish is applied to the paper and dried, the material cannot be salvaged should the application be defective in any way.

Results: Since installation of the first viscometer on the varnish make-up tank, Transo has found that it has been able to hold varnish viscosity to ± 3 centipoise. Machine coating of the paper has become more uniform, reducing product waste and labor costs. The process of coating, to a great degree, has become almost entirely automatic.

Maintenance of the viscometer has been relatively minor. The sensing element has not been found to plug up at all.

Operation was so successful that immediately after the installation of the first viscometer, another instrument was purchased and placed in operation on a second varnish make-up tank.

(Viscometer is product of Norcross Corporation, 247 Newtonville Ave., Newton 58, Massachusetts.)

Check 1208 opposite last page.

Details flow meters

Bulletin of six pages contains ranges, scales, pressures, and mechanical details of indicating flow meters designed for use with air, gas, and liquids. Bul V-100 — Seico Instrument Div., Eclipse Fuel Engineering Co., Illinois National Bank Bldg., Rockford, Illinois.

Check 1209 opposite last page.

Gas Chromatography

From page 133

pen to a 60 cps signal with a magnitude directly proportional to pen position. A vacuum tube linear amplifier uses the signal to drive the current coil of a watthour meter.

By combining the proportional speed of the perforated meter disc with an arrangement of a photocell and a DC amplifier driving a rectilinear recording pen, the integrator develops the necessary pips. Since every tenth perforation is larger in size on the disc, each tenth pip is larger. And every hundredth pip is larger than every tenth.

Composition percentages of a gas analysis can thus be read directly. Accuracy of the integrator is $\pm 1\%$ at point of reading. For analyses which change rapidly with time, faster chart speeds will simplify the counting process.

A refinement that is most useful with the integrator is a high-speed, electromechanical readout counter for individual components and totalizing.

Another improvement expected in the near future for use with gas chromatography units is a printer to provide permanent records of these counter totals. A chart for a particular run of any gas or vapor being analyzed will then include printed totals of its components as part of the record.

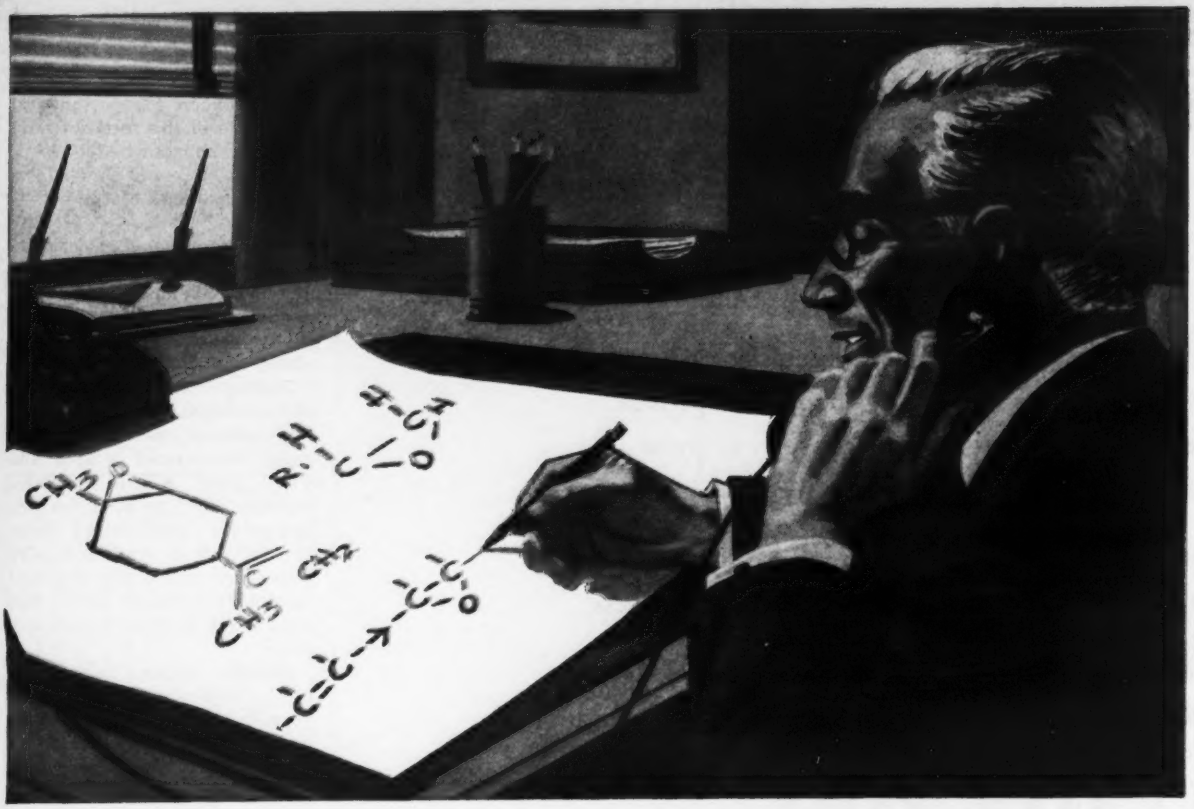
(Further information on the temperature controller and the electronic integrator described is available from Wheelco Instruments Division, Barber-Colman Div., Rockford, Ill.)

Check 1211 opposite last page.

Armored rotameters

Bulletin of eight pages describes armored rotameters designed for pressures up to 5000 psi and for flow rate equivalents up to 3000 gpm of water. Bul 130 — Brooks Rotameter Co., PO Box 432, Lansdale, Pa.

Check 1212 opposite last page.



Are You Familiar with Becco's NEW Epoxidation Techniques?

Want to make a molecule more reactive? Want to build new organic structures? Want to improve stability of your chlorinated products? Want to manufacture plasticizers, surfactants, insecticides?

Epoxidation may be the answer and Becco has the know-how . . . has developed economical epoxidation processes based on the use of organic peracids, preformed or produced *in situ*.

Becco's epoxidation research has also produced several new epoxy compounds; three olefin epoxides, two terpene oxides . . . important intermediates in the manufacture of pharmaceuticals, perfumes, flavors; as plasticizers, surfactants and in other uses.

Consult Becco for the unique advantage of its 30 years of research in the application of peroxygen chemicals.

BECCO CHEMICAL DIVISION
Food Machinery and Chemical Corporation
Station B, Buffalo 7, New York

BUFFALO • BOSTON • CHARLOTTE, N.C. • CHICAGO
NEW YORK • PHILADELPHIA • VANCOUVER, WASH.

Progress in Peroxygens BECCO

fmc FOOD MACHINERY AND CHEMICAL CORPORATION

FMC CHEMICALS INCLUDE: BECCO Peroxygen Chemicals • WESTVACO Phosphates, Barium and Magnesium Chemicals • WESTVACO Alkalis, Chlorinated Chemicals and Carbon Bisulfide • NIAGARA Insecticides, Fungicides and Industrial Sulphur • OHIO-APEX Plasticizers and Chemicals • FAIRFIELD Pesticide Compounds and Organic Chemicals

Check 1210 opposite last page

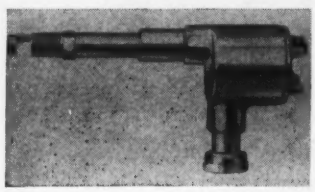
Liquid level sensor uses beta rays

Radiation source is sealed

Uses: As liquid level sensor for water, acids, alkalis, and viscous liquids.

Features: Unit contains no moving parts, and is potentially a trouble-free instrument.

Description: Utilizing a radioactive material in sensing element, liquid level control provides an actuating signal at a predetermined level. Instrument consists of small sensing probe mountable in any position, and connected by cable to an amplifier. Relay in



Simple level sensor is potentially trouble-free

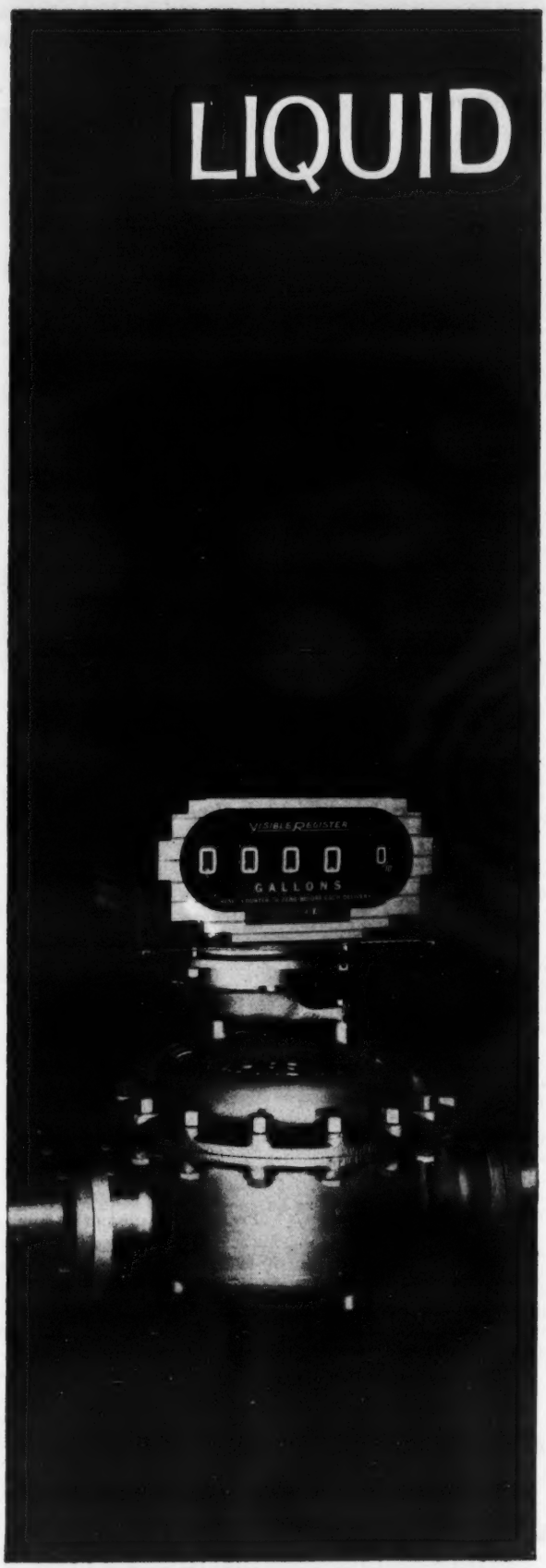
amplifier may operate remote warning devices or motor starter, valves, timing devices, other mechanisms, to maintain desired liquid level.

Source of beta radiation is permanently sealed. Beta ray detector tube is mounted across space from source. When liquid level is below probe position, minimum absorption occurs. When liquid passes through space, radiation is absorbed, thus deenergizing a relay for control of the liquid stream.

Installation is simple. Unit is factory calibrated, and enclosures are available for hazardous locations. Unit operates at 105-125 volts 60 cycles AC. Temperature range for probe is −65 to 220°F, with amplifier temperature range from 0 to 135°F. Probe operating pressure is from vacuum to 800 psi maximum.

(Betatrol level sensor is product of Aeronautical and Instrument Division of Robertshaw-Fulton Controls Co., 401 N. Manchester, Anaheim, California.)

Check 1213 opposite last page.



LIQUID METERING

CAN BE SIMPLE, INEXPENSIVE . . .

and Save You Money!

Perhaps you've felt the need to meter your industrial liquids but have hesitated because you feared metering was costly or complicated. Actually, even a plant-wide installation of simple, direct reading Rockwell meters can be made very easily and for a nominal investment. They will pay their way many times over by providing realistic records for cost, inventory and utilization controls.

Measure Even Corrosive Liquids. Among the many types of Rockwell meters, there is the right design to measure most anything that flows . . . including *all stainless-steel meters* for corrosive liquids.

If you blend, batch or package liquids, Rockwell meter accessories such as automatic shut-off controls, impulse counters and remote registration will cut your costs and increase production. Use the coupon for full details.

INDUSTRIAL METERS

another fine product by

ROCKWELL

CLIP COUPON—MAIL TODAY

ROCKWELL MANUFACTURING CO.
Pittsburgh 8, Pa.

Gentlemen

I am interested in measuring _____ (Name of Liquid)

Pipe Size _____"

Working Pressure _____psi Temperature _____°F max.

Max. Flow Rate _____gpm Min. Flow Rate _____ gpm

Your Name _____

Company _____

Street _____

City _____ Zone _____ State _____

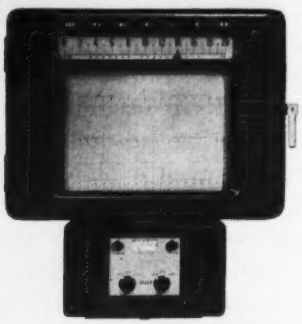
Check 1214 opposite last page

THE MARK OF QUALITY

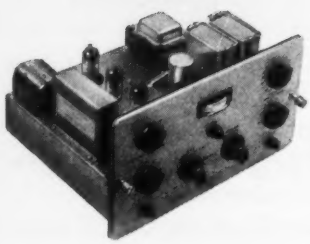
BARBER COLMAN

Wheelco Instruments

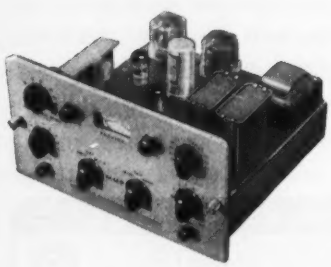
Need proportional reset and rate action? Choose from four controller types – that include magnetic modulation – by Wheelco



Start with this production-proved Wheelco Series 8000 recorder-controller and add the MM Series controller* from four types (three magnetic modulated) available to insure getting the best installation for your needs. This customizing of systems at standard cost is another example of Wheelco's constant effort to improve performance while holding down costs. Advance design features include plug-in components and tamperproof covers to protect critical adjustments.

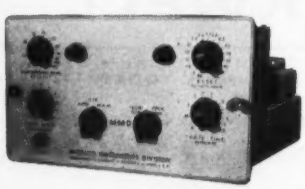


MMC-Current Output Type—Flexible in adaptation to final control elements including saturable reactors, electropneumatic transducers, electro-hydraulic transducers, etc. . . . proportional band adjustable from 2 to 200% of controller range . . . reset action from 0 to 63 repeats per minute . . . rate action adjustable from 0 to 5.5 minutes.



MMP Position Type—Together with potentiometer can position a valve, valve positioner, or other positioning device . . . reset action adjustable from 0.6 to 100 repeats per minute . . . proportional band adjustable from 2 to 200% of controller range . . . rate action adjustable from 0 to 5.5 minutes.

MMD Duration Type—With potentiometer regulates input by adjusting on-time of a contactor on either electrical or fuel-fired installations . . . particularly adaptable when upsets are fast and recovery slow and when they are frequent and of large magnitude . . . keeps overshoot at startup or control point to minimum.

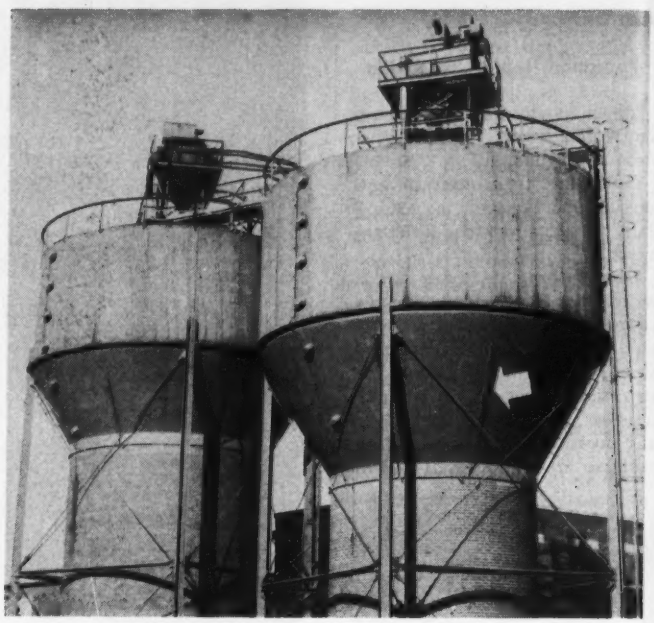


MP Proportional Positioner—Transistorized and printed circuit unit (not shown) where constant voltage source is available as reference voltage . . . mounts inside instrument . . . adjustable from 2 to 40% of recorder range.

*Also usable with Wheelco 2000 and 9000 Series.

BARBER-COLMAN COMPANY
Dept. J, 1520 Rock Street, Rockford, Illinois, U.S.A.
BARBER-COLMAN of CANADA, Ltd., Dept. H, Toronto

Check 1215 opposite last page



"Automated carbon black storage and transfer system was almost unusable due to irregular, constantly interrupted flow of carbon black" . . .

Controlled air keeps carbon black "on tap"

G. J. LAMBTON, Plant Engineer
Tire Division
Dominion Rubber Co., Ltd.
Kitchener, Ontario

Problem: Automated pneumatic carbon black storage and transfer system at Tire Division of Dominion Rubber Company, Ltd., Kitchener, Ontario, was almost unusable because of irregular, constantly interrupted flow of carbon black. Material bridging was almost uncontrollable. And any stoppages in the flow of black resulted in undesirable interruptions of plant production.

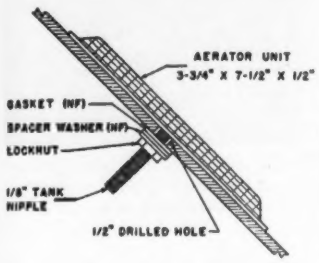
Whenever the supply of black became low in each day service bin, material level indicators would energize the reloading mechanism beneath outside storage tanks. Rotary feeders fed black from storage tanks into a scale hopper. The black would then be discharged into conveying system.

Only a very few minutes at most could be allowed for refilling the day service bins. But often as not, the black would not flow into the rotary feeders due to bridging over the opening. Bagged carbon black had to be kept at the bins to alleviate the shortages.

Solution: Test installations were made of an automatic aerator to restore to the black its original capacity to flow readily from bins or through chutes. It was found that the unit, using low pressure air,

Two multiple compartment carbon black storage tanks at Dominion Rubber Company, Ltd. Air lines (arrow) lead to aerators inside tanks which keep the black a free-flowing material. Knob-like units are material level indicators

Diagram of aerator used at Dominion to "fluidize" carbon black



literally fluidized the material in the strategic areas.

Because of the successful tests, plant engineering department decided to incorporate the aerators wherever required in the storage and transfer system. Since it was necessary to re-locate the entire system of pipe, bins, banbury feed hoppers, and controls because of a plant expansion program, the installations were readily made.

How It Works

The aerator restores to any dry, pulverized material its original capacity to flow by replacing the air lost because of packing. Once the air is replaced, the material will again move freely.

This is done by injecting an automatically controlled volume of low pressure air into the material through a non-clogging fabric diffuser. Operation can be intermittant or continuous, and can be controlled manually or automatically.

At Dominion Rubber the storage compartments and day service bins were fitted with four to six rows of the aerator units. The material level in-

SWARTWOUT AutroniC® INSTRUMENTATION

eliminates trouble at the transmitter - - - where trouble is really TROUBLE

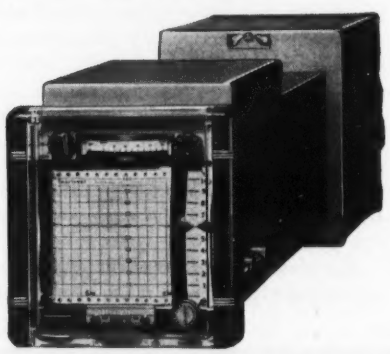
The differential transformer, heart of the transmitter, is so dependable in operation that Swartwout guarantees its performance unconditionally for life. What more could be said?

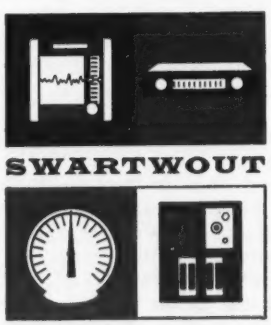
Added to the control advantages of the fully electronic loop is the dependability of the exclusive AC-DC system. It offers the best of everything: AC in sensory and amplification circuits; DC in the control output signal. It is tested, proven and praised by users in all fields.

For good reasons, the trend is definitely AutroniC . . . and the full facts are available to you in a new series of four bulletins. Request Bulletin Series A-801.

No instrument transmitter, either developed or on the horizon, matches Swartwout in simplicity . . . reliability . . . or performance.

Swartwout offers utmost reliability where it counts most: out on the process line. Without tubes or transistors . . . electrical adjustments, slide wires or involved circuitry . . . without orifices to plug or magnetic amplifiers . . . the AutroniC transmitter has virtually nothing that can fail. No tinkering; no tampering; no replacements; no trouble.



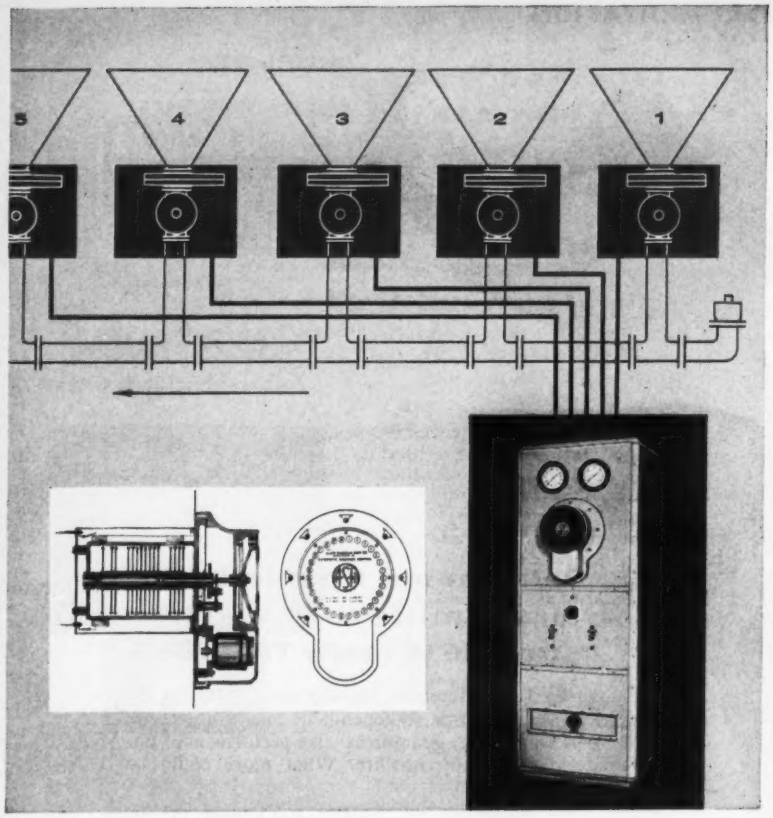


SWARTWOUT

. . . world leader in electronic process instrumentation

THE SWARTWOUT COMPANY
18511 EUCLID AVENUE,
CLEVELAND 12, OHIO

Check 1216 opposite last page



AUTOMATIC SEQUENCE CONTROL
solves handling and mixing problems

Here is a proven, practical control that will activate up to 30 pieces of equipment in one cycle—more by recycling—required to operate in a predetermined order. These may be valves, motors or other related equipment, and may be activated by almost any predetermined external impulse: change in vacuum, pressure, temperature, weight, electrical, etc.

The A-S-H Automatic Sequence Control is a completely contained unit that can be mounted on a standard cubicle or your existing panel board. Indicator lights inform operator of progress of operation. Idle portions of systems may be bypassed by group selector switches located adjacent to the Control.

For detailed information and illustrations, request our *new* 4-page Data Sheet EEa, "Automatic Sequence Control."

the Allen-Sherman-Hoff company
257 E. Lancaster Ave., Wynnewood, Pa.
Offices and representatives in principal cities
MATERIALS HANDLING EQUIPMENT

Check 1217 opposite last page

dicators were spaced 15 inches on centers and the rows were carried up the sloping sides of the bins in a vertical plane. Air pressure used in the manifolds connecting the aerator units approximates 2½ psi during discharge periods.

Results: With use of aerator units, the material level indicators can call for carbon black from a storage bin 500 feet away and receive delivery within three minutes. The free-flowing condition of the black is being constantly maintained without any need of mechanical service.

Success of the revised system of handling carbon black has permitted other advantages. Inside plant floor space formerly used for bag storage is more advantageously employed. A most undesirable and dirty job of manually loading the bins has been eliminated. With cleaner working conditions, morale of the workers has improved.

(Bin-Flo aerator units are product of The Bin-Dicator Co., PO Box 3708, Detroit 15, Michigan.)

Check 1218 opposite last page.

Manual control set-up aids quality control on concrete block

Permits positive regulation at less expense

Problem: As a small company, Capitol Concrete Products Company of Topeka, Kansas, did not wish to install a completely automatic control system on a high-pressure steam curing autoclave for concrete block. Cost of such an installation was the reason. Also, since an operator had to be "on deck" at all times, management wanted to use his services.

But the usual difficulty in manual control involving steam lines is "too much or too little" resulting in an inadequate temperature control.

Solution: Four manually-operated valves — 1, 1½, 2, and 2½ inches in size — together with a recorder complete the control installation.

The recorder provides a graphic record of temperature and pressure.

The entire control system rests on use of the four valves at the proper times during the concrete block curing process. To start the build-up of pressure, the 1-inch valve is used, being turned full-on. The others are turned on after proper intervals.

Two recorders for temperature and pressure control concrete autoclaving process

Thus a gradual build-up of pressure and temperature is obtained.

Positive control is especially important during the three-hour pressure building period. If the build-up is too fast, steam will damage the blocks. After build-up, steam pressure is maintained for five hours. A fifteen-minute blow-down completes process.

Results: Capitol Concrete Products has achieved the necessary control for a denser, higher strength, more stable concrete block without expense of automatically controlling the 128-foot autoclave. Positive control has been achieved at a low cost.

Installation is working so well that company plans to add two more autoclaves with same control features.

(Series 100 recorders are product of Powers Regulator Company, 3434 Oakton St., Skokie, Ill.)

Check 1219 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Measures liquid level under pressure or vacuum

Level indicator adaptable to many materials

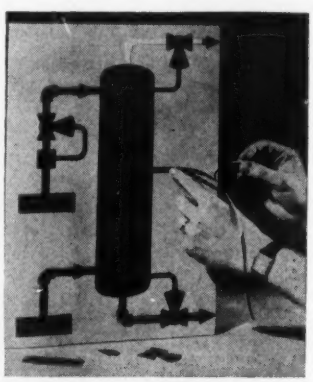
Uses: As liquid level indicator operating independently of tank location or content.

Features: Instrument measures liquid level under pressure, vacuum, or open to atmosphere. Can be applied to measurement of acids, alkalies, many corrosive materials.

Description: Liquid level instrument operates on manometer principle. May be calibrated in units of depth as inches or feet, units of weight as pounds or tons, or units of volume as gallons, barrels, drums, or cubic feet. Many standard models are available including a hand-pump actuation model.

(Tank-O-Meter is product of Uehling Instrument Co., Inc., 488 Getty Ave., Paterson 3, New Jersey.)

Check 1220 opposite last page.

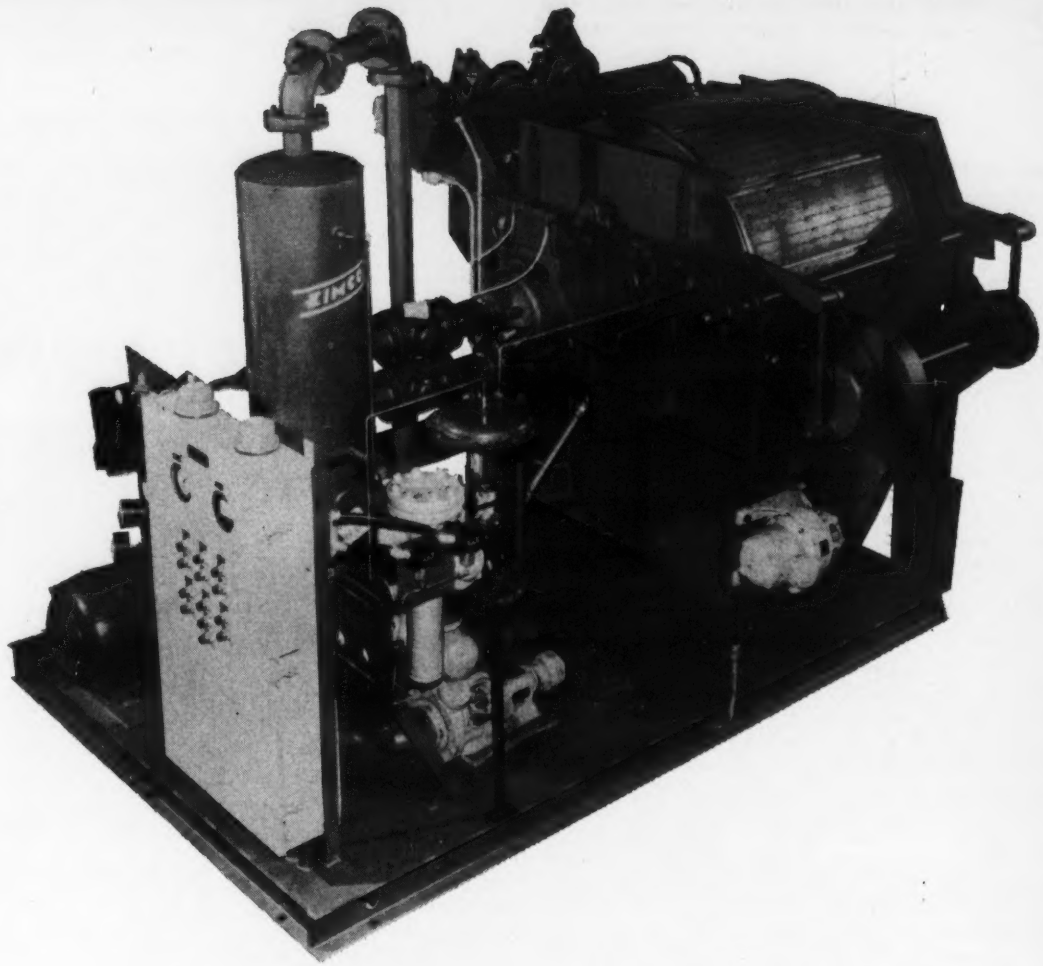


Graphic symbols

. . . on pressure-sensitive plastics simplify panel-board modification. Symbols come in wide range of colors, are easily applied by pressing into place. Modification kits include lines, arrows, other graphic symbols necessary.

(Plastigraphic symbols are a product of Panellit, Inc., 7401 North Hamlin Avenue, Skokie, Illinois.)

Check 1221 opposite last page.



PUSH BUTTON FILTER STATIONS

Now you can operate your filter station with push buttons. Controls are energized manually, and from that point on the various functions of the station are automatic within predetermined operational limits.

The success of such an automated filter station depends upon careful pilot plant study and analysis to determine the range of variables that the equipment must handle if it is to meet the full plant requirements: the limits of acceptable clarity, moisture content of dewatered material, amount of precoat feed and many others.

Answers to these questions need not be as much of a headache as they seem because that's where Eimco comes into it with it's Research and Development Center. With your permission we can take over the problem, work it out and present you with a workable station to produce your product.

Eimco has more experience solving difficult filtration problems and a more complete line of filtration equipment with which to solve filtration problems than any other manufacturer. For additional information write The Eimco Corporation, Salt Lake City, Utah.

THE EIMCO CORPORATION
SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois • Process Engineers Inc. Division, San Mateo, California
Export Offices: Eimco Building, 51-52 South Street, New York 5, N. Y.
B-341
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

Check 1222 opposite last page

Here's another example of how processes for "old reliable" products are being streamlined to keep up with demand in our changing times. Plant in Butler, N. J., produces . . .

SILICA GEL – by continuous process

TED F. MEINHOLD, Associate Editor
with **DR. ALBERT H. COOPER,** General Manager
American Industrial Chemical Company

CP Staff Photo

▲ Polymerization takes place on 60'-long by 5'-wide trough-like conveyor

Silica gel, made for years by batch operations, is being mass-produced by means of a new continuous process. Developed three years ago at Pratt Institute by Dr. Albert H. Cooper, the process is in operation at American Industrial Chemical Company, Butler, N. J.

Capable of operating around-the-clock, seven days a week, process turns out top-quality product with uniform consistency. Flexibility of operations is such that plant can produce wide variety of silica gels.

As in conventional silica gel processes, first step is to form silica hydrosol. This is done continuously in the new process by mixing sodium silicate solution with sulfuric acid. The two ingredients are withdrawn from storage tanks and metered, under rigid control, into an agitated tank. Ingredients are charged to the unit through a special arrangement at top of tank.

The two streams of liquid converge and are agitated by a method that assures maximum mixing efficiency. Feed ratio and temperature vary with type of silica gel being produced.

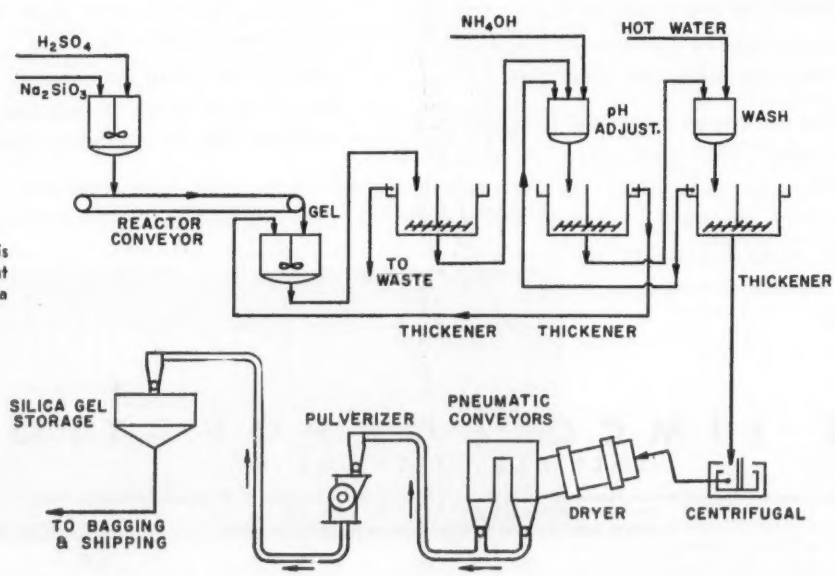
Resulting mixture is then fed at a controlled rate into a 60'-long by 5'-wide, trough-like, endless-belt conveyor. Mixture gradually begins to gel as it moves along the conveyor. By the time it reaches the opposite end, complete polymerization has taken place.

The mass then drops into an agitated dilution tank where the gel is broken up and diluted with hot water, ready for neutralization and washing.

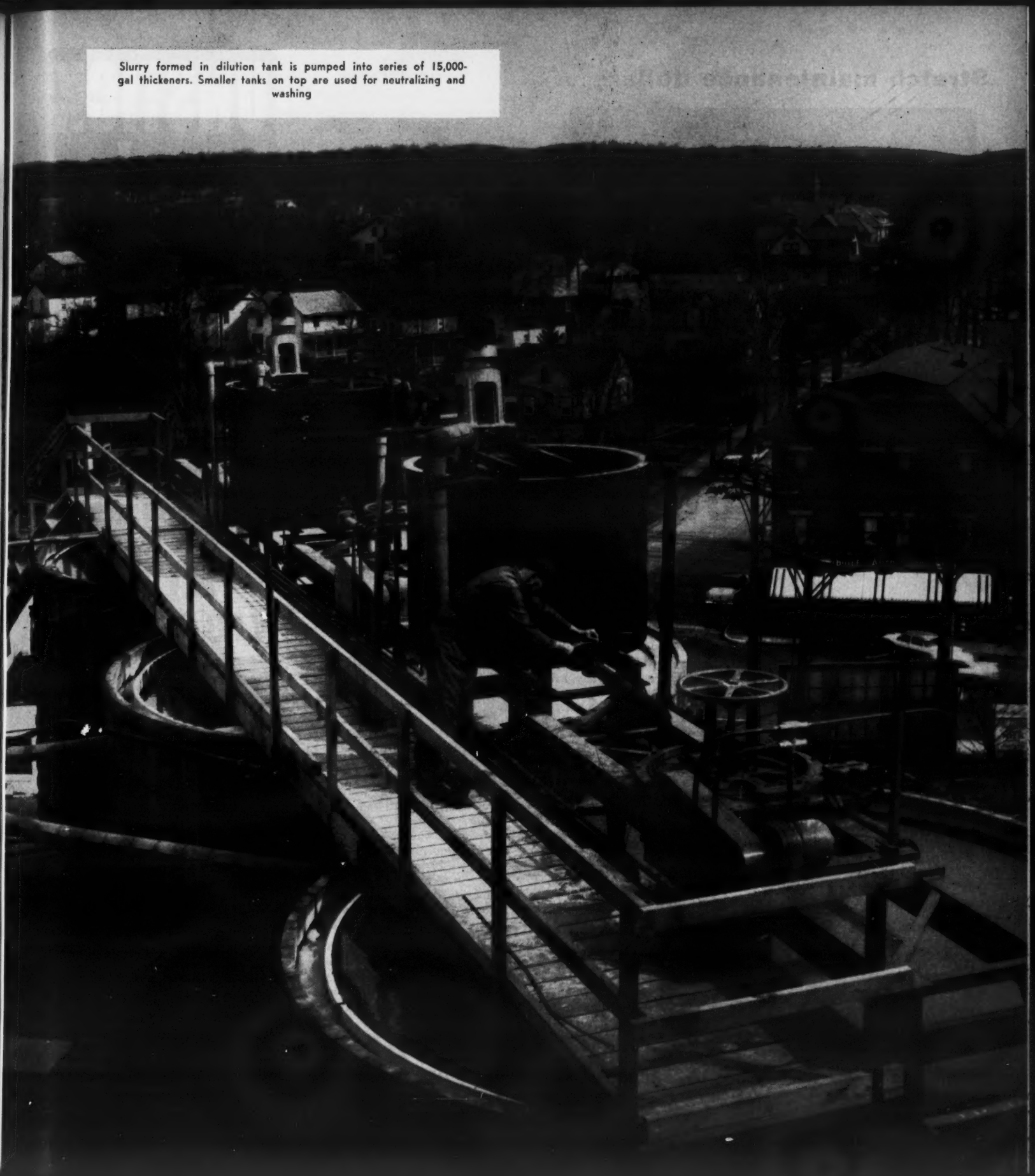
Slurry formed in tank is withdrawn continuously from bottom and pumped into series of three 15,000-gal thickeners. Neutralization is accomplished by continuous addition of ammonium hydroxide, amount of which depends upon grade of silica gel being produced. Washing is conducted with 175°F water.

Flow through thickeners is arranged so that most of wash water is recycled to original dilution tank. Only the overflow from first thickener, which contains considerable sodium sulfate, is discarded.

Slurry withdrawn from third thickener contains about



Continuous process is flexible, can turn out wide variety of silica gel grades



Slurry formed in dilution tank is pumped into series of 15,000-gal thickeners. Smaller tanks on top are used for neutralizing and washing

Stretch maintenance dollars...

by *Repairing* corroded concrete with NEW Penntrowel SURFACING COMPOUNDS

Next time you're faced with badly corroded concrete, brick or cement surfaces in your plant, call for PENNTROWEL corrosion-proof surfacing instead of a jack-hammer crew.

Unmatched chemical resistance and toughness. PENNTROWEL packs *triple* power . . . combines high chemical resistance, impermeability and inseparable bonding. It gives long, rugged service, with no cracking or sloughing off.

Fast, economical repair. You mix as much PENNTROWEL mortar as you need, right at the jobsite . . . then just trowel it on. It cures overnight, is ready for service the next day. And its cost is amazingly low!

PENNTROWEL corrosion-proof surfacings have been proved on the job in Pennsalt's own fluorine, chlorine and caustic plants. Three grades give top performance in any corrosion or wear application.

Write Today
for PENNTROWEL folder CP-627 and installation cost data.

Corrosion Engineering Products Dept. 654
PENNSALT CHEMICALS CORPORATION
Natrona, Pa.

Penntrowel is a trade-mark of Pennsalt Chemicals Corp.

Pennsalt Chemicals ESTABLISHED 1850

Check 1223 opposite last page

IDEAS

10% solids. Mixture is sent to a continuous 24"-high by 30"-long centrifuge which lowers moisture to 80-82%. Product then goes to rotary dryer.

Use Pneumatic Conveying Systems

Two negative-pressure pneumatic conveying systems pick up the granular material from dryer and transfer it to two continuous hammermills. Each system consists of 17-2/3' horizontal and 16' vertical 4"-diam lines. Systems use 440-cfm air.

Rigid control throughout process assures continuous production of top-quality, uniformly consistent silica gel

Rotary-vane airlocks are used to control feeding into system. Screw-feeder feeds silica gel into system at rate of ½ to 1 cfm. Feeder is equipped with small explosion-proof gear motor. Manually operated two-way valve is installed under collector airlock over pulverizer. If desired, this valve can be set to permit bypassing pulverizer, so that product can be discharged directly into drums at floor level.

Hammermills reduce particle size of product as specified by customer. After size reduction, material is conveyed to storage hoppers by means of the pneumatic systems.

(Further information about silica gels may be obtained from American Industrial Chemical Company, Div. of Amerace Corp., Butler, N.J.)

Check 1224 opposite last page.

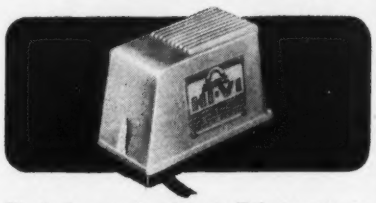
(Pneu-vac negative-pressure conveying systems are product of Sprout, Waldron & Company, Inc., Muncy, Pa.)

Check 1225 opposite last page.

UNSTICK *stuck* BINS

with new electro-permanent magnetic

ERIEZ HI-VI VIBRATORS



Here's the newest and most efficient answer to those hard-to-move materials in sticky bins . . . designed to provide superior operating efficiency . . . exclusive pinpointed vibration gets right to the trouble spot — starts stubborn materials moving!

NO RECTIFIER NEEDED • COMPLETELY ENCLOSED HOUSING • GREATER VIBRATION IMPACT THAN COMPARABLE SIZE UNITS • RUGGED AND DURABLE • LOW FIRST COST • LOW OPERATING COST • Special Mill Mutual ACCEPTED Units for HAZARDOUS DUSTY LOCATIONS

GET THE WHOLE STORY . . . WRITE TODAY.
Eriez Mfg. Co., 73JB Magnet Dr., Erie, Pa.

ERIEZ

Check 1226 opposite last page

Adhesive foaming technique gives cost savings

Here's a method for making foamed adhesives for use on plywood and paper veneer boxes, plywood overlays, gummed paper, particle boards, laminated beams, and other forest products.

Technique works well with coldsetting, thermosetting, and thermoplastic adhesives. Successful plant runs have been made with commercial phenol-formaldehyde adhesives for plywood, and polyvinyl acetate adhesives for laminating paper to wood. Successful lab runs have been made with melamine, urea, polyvinyl chloride, casein, blood, and animal glues.

By using this method, constant-volume foams can be produced on conventional spreading equipment.

The volume of adhesives can now be extended by four to five times, providing more uniform spread and — according to the developer — even better bonding qualities.

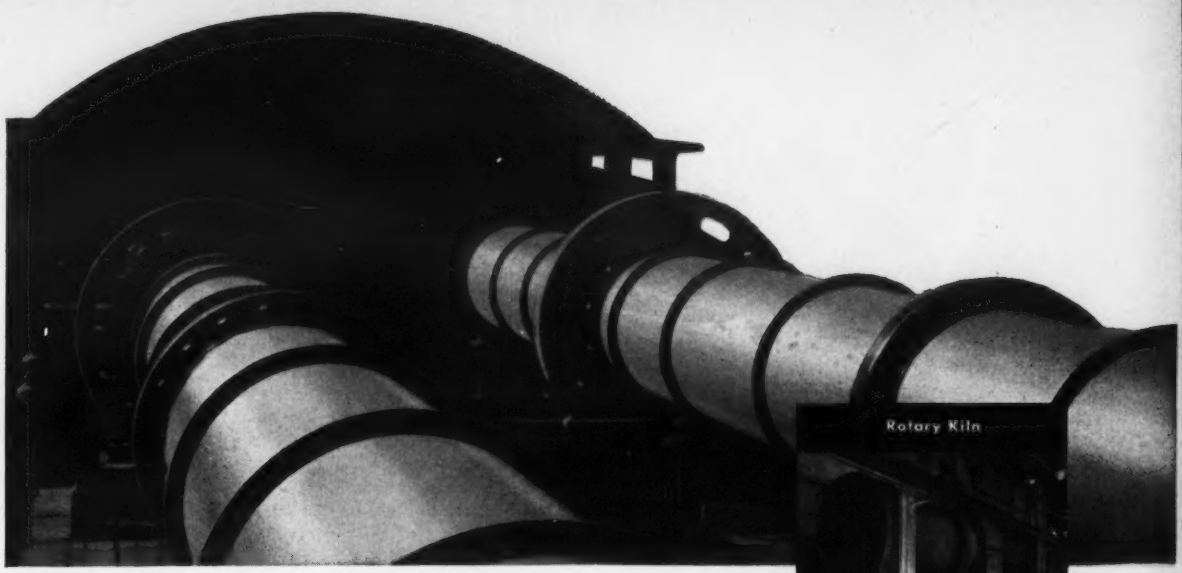
This should result in sizeable cost reductions and improved product quality.

Description of process cannot be completely disclosed because patents are still pending. However it is based on use of specific chemical compounds to adjust some of the physical properties of standard adhesive mixes and to produce a stable foam by a simple mechanical operation. Extension of resin mix can be controlled within limits, and equipment has been modified so that foam may be produced at any rate from 100 to 1000 lb/hr.

Company will provide licenses and know-how on application of this foaming technique to any product and with any adhesive, other than the phenol-formaldehyde resins. Company is not free to work on the latter product with new clients for another year.

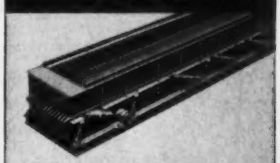
(Foamed adhesive system is licensed by Arthur D. Little, Inc., 314 Battery St., San Francisco 11, Calif.)

Check 1227 opposite last page.

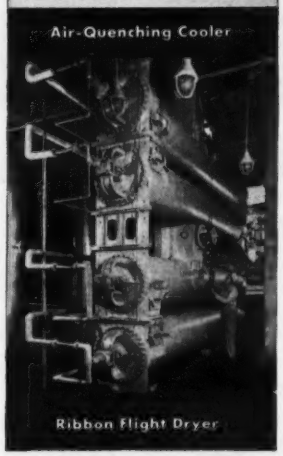


Rotary Kiln

Rotary Dryer



Air-Quenching Cooler



Ribbon Flight Dryer

Heat Transfer Efficiency

...depends on more than equipment

AN array of even the best heat transfer equipment isn't enough. To increase production, lower processing costs and improve product quality, this equipment must be coordinated into an efficient flow design. Allis-Chalmers recommends equipment only after a detailed study of all processing factors.

Call in an A-C Engineering Team

Allis-Chalmers engineers concern themselves with the entire operation: the evaluation of variables . . . plant design . . . the integration of equipment into a complete process. A-C has complete facilities for pre-recommendation research, and pilot plant testing, if necessary.

Expert installation supervision and local field service are supplied by Allis-Chalmers. After installation, Allis-Chalmers provides periodic check-up, maintenance advice and, of course, fast parts service for the life of the equipment.

Ask your nearby A-C man for Bulletin 25C6177, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

Partial list of material processed by A-C heat transfer equipment

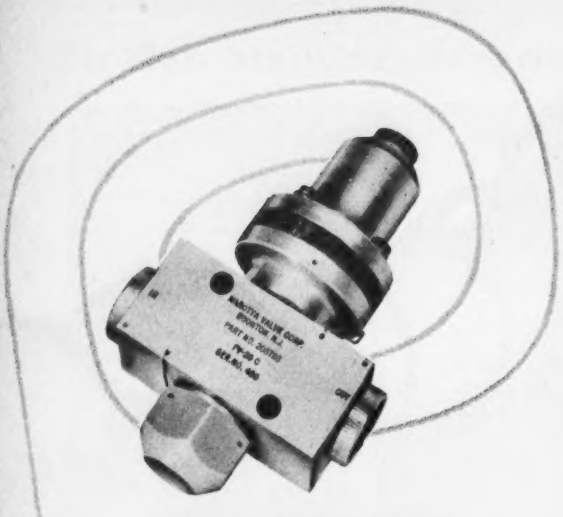
Limestone	Alumina	Phosphates	Fuller's Earth
Lime	Bauxite	Refractories	Nickel Ore
Dolomite	Manganese Oxide	Foundry Sand	Copper
Magnesia	Iron Ore	Petroleum Coke	

A-C ALLIS-CHALMERS

A-5692

ALLIS-CHALMERS

Check 1228 opposite last page



"MAROTTA'S VERSATILITY VALVE"

Flow Controls Over 16 Different Mediums including Hydrogen Peroxide and Liquid Oxygen

Marotta valves of the PV-20 series are presently in use industrially, on aircraft, missiles and rockets.

Such wide spread applications implies creative design...quality controlled production...dependable delivery you can rely on when you specify Marotta's PV-20 or any other of their over 300 models now in general use throughout industry.

SPECIFICATIONS

Type: 2-way, 2 position, normally closed valve

Pressures: Rated 3000 p.s.i.g.; Proof—4500 p.s.i.g. Burst—6000 p.s.i.g.

Capacity: Equivalent sharp edged orifice diameter .345"

Line Size: ½" tube

Control Fluid: Pneumatic or Hydraulic

Control Pressure: 1200 p.s.i.g. max., ½ line pressure minimum.

Control Line Size: ¼" tube

Ambient Temp. Range: -300° F. to +300° F.

PRV-11A Special 6", 160 psi LOX Pressure relief

MV-74-H ⅛" three-way 6000 psi General Purpose Solenoid

MV-41A ¼" N.C. 1000 psi Fuel Solenoid

RV-4 ⅜" 60 psi Integral Relief Pressure Regulator

MV-36 ½" N.C. 3500 psi Internally Piloted Solenoid

Write or call for complete information. Experienced engineers available for consultation.

Marotta VALVE CORPORATION

pioneer producers of high pressure valves

P. O. BOX 330-N BOONTON, N. J.

Check 1229 opposite last page

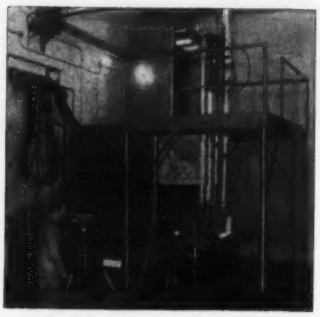
IDEAS

Irradiation center services on rental basis

Entire installation available for $100 per hour

Contract irradiation facility, designed solely to operate for profit, has been opened in Rockford, Illinois. Industrial groups interested in radiation research or production processing can lease the entire installation for as little as an hour or as much as several days per month. The whole package costs $100 an hour.

The center has one of the highest energy linear accelerators in the country. It operates as high as 9-million



Entire irradiation facility can be rented for either research or production purposes

electron volts (Mev) and can irradiate with electrons materials of unit density up to 1" thick; by irradiating 2 sides, over 2" sections can be uniformly treated.

With a simple tungsten target, the electron beam is converted to X-rays more penetrating than gamma rays from cobalt-60. Beam is equivalent to 140,000 curies of cobalt-60. It can process up to 1600 megarads-lb per hour. Center has all necessary auxiliary equipment.

(Midwest irradiation center is owned by W. F. and John Barnes Co., 301 South Water St., Rockford, Ill.)

Check 1230 opposite last page.

(Mark I-F2 linear electron accelerator was furnished by Applied Radiation Corporation, 2404 North Main St., Walnut Creek, Calif.)

Check 1231 opposite last page.

Transfer "STICKY" STUFF "Direct-from-Drum" To Job!

NEW Better Way To Transfer Adhesives Foods Sealers Plastics Putties

And 100's of other hard to handle materials.

Cleans your drums at the same time!

● This new, air-operated pump and forced induction plate completely seals in the material, prevents contamination, spillage, channeling and waste. Eliminate slow hand operation and messy transfer of difficult material!

You paid for all of it . . . now get all of it! Graco Inductors move from top to bottom, scrape drum sides entirely clean, get *all* material from drum. Sizes for 55 gal. drum, half drum or 5 gal. pail. Write today for details!

GRACO "DIRECT-FROM-DRUM" PUMPS

GRAY COMPANY, INC.

92 Graco Square • Minneapolis 13, Minnesota

FACTORY BRANCHES: New York (Long Island City) • Philadelphia • Detroit Chicago • Atlanta • Houston • San Francisco

SALES OFFICES: Washington • Toronto

Check 1232 opposite last page

OFF THE SHELF DELIVERY
from the greatest lineup of plastic jars and vials available anywhere
Polystyrene, acetate, butyrate and polyethylene jars and vials for:
Electronic components . . . Small machine parts . . . Tools . . . Powders and hundreds of other purposes
They'll protect your product from moisture, contamination, dirt. Shatterproof Clearsite vials are easy to label or print in 1 to 5 colors. Tell us what you want to package and we'll send you free samples and literature. Address Dept. G.
CELLUPLASTIC CORPORATION
Sales Office: Newark 5, New Jersey

Check 1233 opposite last page

PROBLEMS?

Interested in solving them? Want to learn new ways of improving your plant operation and, thereby, realize savings?

In each . . .

issue of CHEMICAL PROCESSING there are articles that will help you solve many of your operational problems.

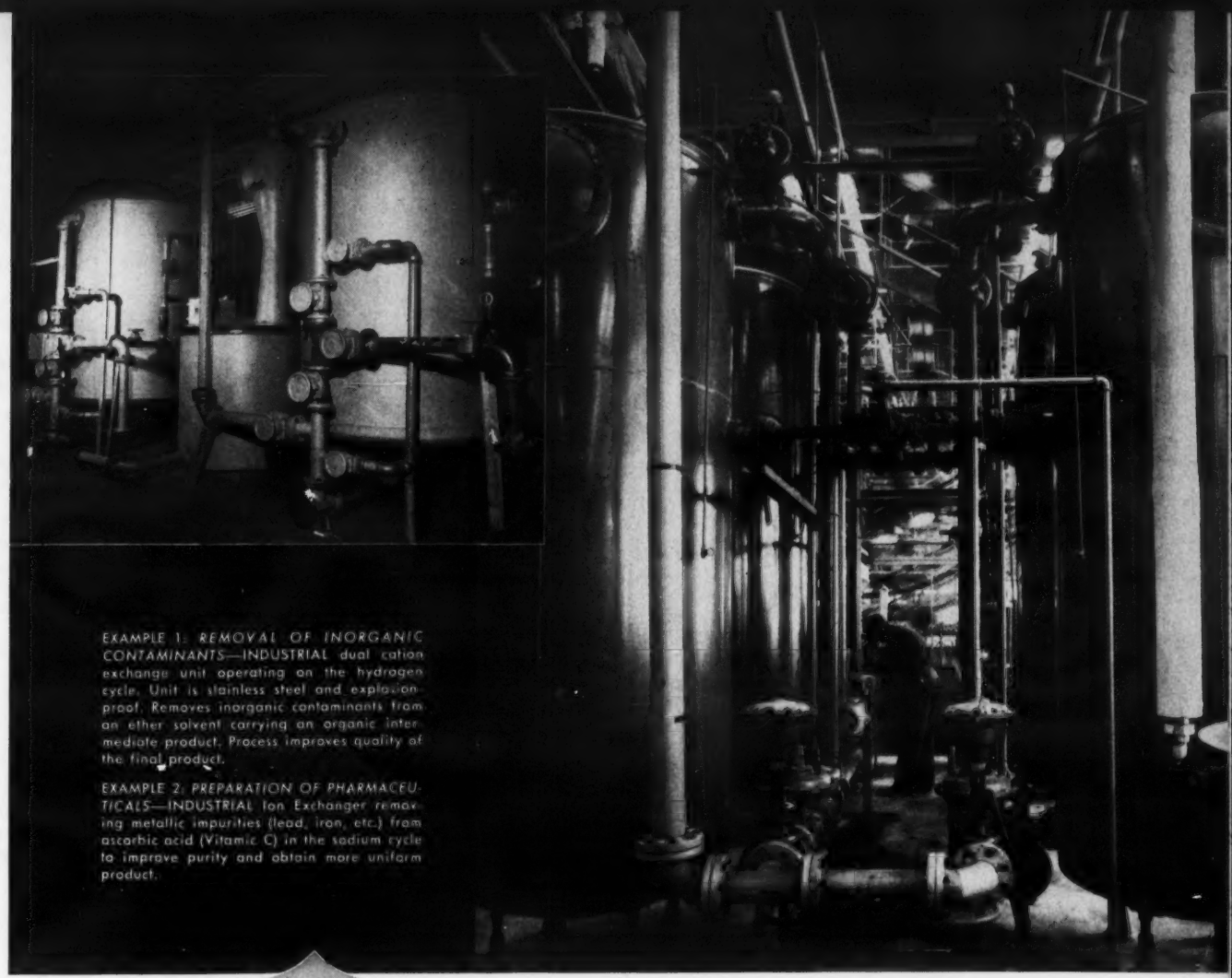
These "New Solution" stories are listed in the table of contents under the "New Solutions" section which begins on page 70 of this issue.

This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained.

"New Solution" stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion, to name a few. This issue may contain the answer you need.

For more information on product at right, specify 1234 see information request blank opposite last page.



EXAMPLE 1: *REMOVAL OF INORGANIC CONTAMINANTS*—INDUSTRIAL dual cation exchange unit operating on the hydrogen cycle. Unit is stainless steel and explosion-proof. Removes inorganic contaminants from an ether solvent carrying an organic intermediate product. Process improves quality of the final product.

EXAMPLE 2: *PREPARATION OF PHARMACEUTICALS*—INDUSTRIAL Ion Exchanger removing metallic impurities (lead, iron, etc.) from ascorbic acid (Vitamic C) in the sodium cycle to improve purity and obtain more uniform product.

INDUSTRIAL ION EXCHANGERS

meet highest purity standards for continuous processes

Every day INDUSTRIAL Ion Exchangers are *replacing* expensive, complicated processing equipment in the purification of literally hundreds of chemical products. Why? Because INDUSTRIAL has successfully adapted the newest developments in ion exchange research to simple techniques. This new equipment provides advantages like these: NO HOLD-UP TIME . . . LOWER CAPITAL INVESTMENT . . . LOWER OPERATING COSTS . . . PLUS—PURITY STANDARDS TO MEET VIRTUALLY ALL REQUIREMENTS!

The operating simplicity of these new techniques permits immediate integration of an INDUSTRIAL Ion Exchanger in almost any continuous chemical process. The views on this page show some current specialized applications.

Investigate how INDUSTRIAL Ion Exchange equipment can solve your purifying problems at lower costs. Call or write today for details covering an analytical economics study.

INDUSTRIAL

C-258

INDUSTRIAL FILTER & PUMP MFG. CO.
5908 Ogden Avenue, Chicago 50, Illinois

PRESSURE FILTERS ◆ ION & HEAT EXCHANGERS ◆ WASTE-TREATING EQUIPMENT

WILL HANDLE THEM ALL!

Wedge and sealing rings molded from DuPont Teflon assure efficient, safe handling of industrial chemicals and corrosives at temperatures from −120°F. to +500°F. on many services. Spring and metal parts are furnished in the metallurgical specification best suited to the particular service. In every way, you get a mechanical seal that is "John Crane" engineered to your requirements—no matter how tough!

The Type 9 Seal has and continues to solve innumerable problems where difficult-to-handle liquids and gases are involved . . . at pressures up to 750 psi. It can do the same for you.

Use the Type 9 Seal on all rotating shaft equipment—centrifugal and rotary pumps, mixers, agitators, autoclaves, other equipment.

REMEMBER: ***Your toughest problem can be the Type 9's next success story.*** **Send for full details today.**

Crane Packing Co., 6421 Oakton St., Morton Grove, Ill., (Chicago Suburb). *In Canada: Crane Packing Co., Ltd., Hamilton, Ont.*

CRANE PACKING COMPANY

Check 1235 opposite last page

Two yr tests indicate economic feasibility of shale oil process

Pilot plant studies conducted at Denver Research

Shale oil produced by Aspeco process (see CHEMICAL PROCESSING, October 1956, pages 84-85) can be made to yield liquid fuel at costs competitive with those for domestic petroleum, according to Denver Research Institute, University of Denver. Studies on the process have been conducted over a two-year period and included operation of a 24 ton/day pilot plant.

Logical market for shale oil produced in Colorado is California and the Pacific Coast area. According to S. A. Johnson, Jr., director of the institute, total cost of crude shale oil in California would run $1.65 per bbl for a plant depreciated over a 10 yr period and $1.42 for a plant depreciated over 20 yr.

These prices are exclusive of interest on invested capital or construction capital, profit, federal income tax, credit for depletion allowance, or royalties. (Current cost of California crude oil is about $3.00 per bbl.)

Capital requirements for a plant of 19,200 tons/day of shale capacity would be about $23 million. From shale containing 25 gal of shale oil per ton, this would yield 11,400 bbl/day of uncoked oil (8900 bbl of coked oil), and 6320 million cu ft/day of retort gas.

Oil produced by process, without coking, has sp gr of 20° API, nitrogen content of 1.6%, sulfur content of 0.7%, and 70-80°F pour point. Retort gases contain about 30% CO_2, 25% H_2, 1.5% H_2S, and 43.5% LPG and light hydrocarbons.

Studies have shown that retorting costs are as much as 50% lower than those disclosed for any other shale oil process to date. The pilot plant at Denver Research Institute will be operated for balance of year to obtain further data. At conclusion of these operations consideration will be given to building a 1200 to 2400 ton/day plant.

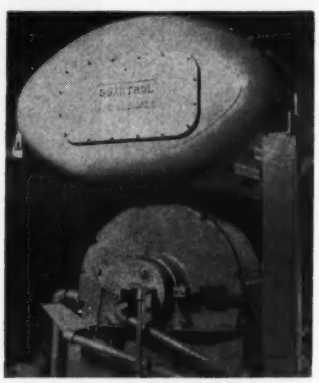
(Western Hemisphere rights to process and patents upon which it is based, are held by The Oil Shale Corporation, Carson City, Nevada.)

X-ray analyzer adapted for use on filters

Accurately tells composition of liquids, solids

Already used with success in plating operations, automatic X-ray type analyzer has been adapted for use on filters or on continuous conveyor lines.

The analyzer will continuously determine, both qualitatively and quantitatively, presence of a critical element. Unit is not, at present, adaptable to analyses in the lower atomic range of periodic table: below atomic number 18.



Pilot plant installation of X-ray analyzer over drum filter

Equally suited to liquid, powder, or solid streams where a continuous determination is important, analyzer has been tested successfully on a rotating drum filter using recirculating slurry.

Another installation monitors five or six different elements, including copper, sulfur, phosphorus, arsenic. By difference measurements, instrument might be applied to judging thickness of plastic films, plastic coatings on metals, or any similar process.

Of three components nec-

essary for operation, only spectrometer with its X-ray tube is mounted directly on processing unit or production line. Head can be oriented in any direction for analyses of top, bottom, or sides of stream. Power supply should be mounted close by. Console can be away from the line.

(Quantrol X-ray analyzer is product of Applied Research Laboratories, 3717 Park Place, Glendale 8, Calif.)

Check 1236 opposite last page.

Catalyst life doubled in moving bed crackers by treating process

Costs only $5000 to install in 20,000 bpd unit

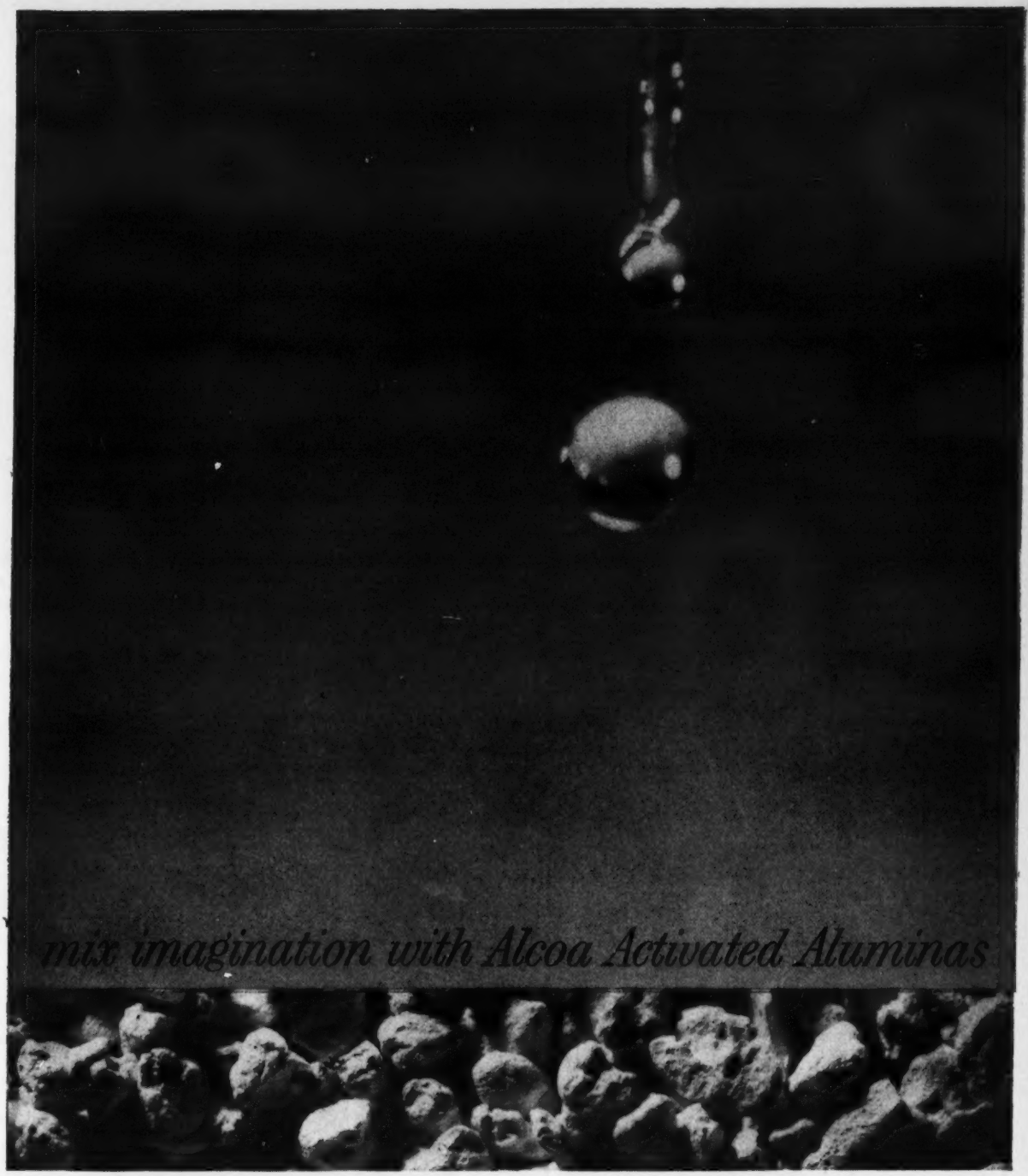
Catalyst treating process has been developed that can cut in half cost of replacing worn-out catalyst in a moving-bed cracker. Process, already tested in commercial operations, is reported to more than double life of catalyst without reducing its efficiency.

Although details have not been revealed, results are said to be obtained through complex chemical and physical process that prevents rapid deterioration of catalyst beads which occurs when they grind against each other or come in violent contact with interior surfaces of the equipment.

Installation costs are estimated to be less than $5000 for a 20,000 bpd plant. Operating costs are less than $5 per day for materials per hundred tons of catalyst inventory.

Process is currently installed in eight plants ranging in capacity from 13,000 to 25,000 bpd. Catalyst requirements are reported to have been cut from 43 to as much as 77%.

(Catalyst treating process is available through license agreement from California Research Corporation, A Standard Oil Company of California subsidiary, 200 Bush Street, San Francisco 20, California.)



to remove the last drop of unwanted product or process water. Is unwanted water undermining your product quality . . . or ruining the efficiency of your process? If so, try this sure solution to your dehydration problems: mix imagination and engineering with Alcoa® Activated Alumina. You can count on this old reliable among commercial desiccants to achieve the lowest dew points you require. It can never soften, swell or disintegrate. It is nontoxic, noncorrosive and practically iron-free. It can be saturated and reactivated through almost endless cycles—to keep drying costs low. Put the proved effectiveness of Alcoa Activated Alumina to work in solving *your* dehydration problems. Drying machines charged with Alcoa Activated Aluminas are available from a number of manufacturers. For their names, or for product information, contact your local Alcoa sales office. Or write ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 705-J Alcoa Building, Pittsburgh 19, Pa.

ALCOA CHEMICALS
ALUMINUM COMPANY OF AMERICA

"ALCOA THEATRE"
Exciting Adventure
ALTERNATE MONDAY EVENINGS

For finer products . . . let Alcoa add new dimension to your creative thinking!

Check 1237 opposite last page

PUMPING IDEAS Possible only with a

SIGMAMOTOR PUMP

Move Corrosive Liquids

Material being pumped never comes in contact with pump mechanism. Wave-like motion of steel fingers forces material through Tygon tubing. By changing size of tubing, capacity can be increased or decreased. Pump housing opens for removal and insertion of tubing.

Pump 2 or 3 Different Liquids Simultaneously

Some models will accommodate up to four tubes so that four different liquids can be passed through the pump at one time without danger of contamination.

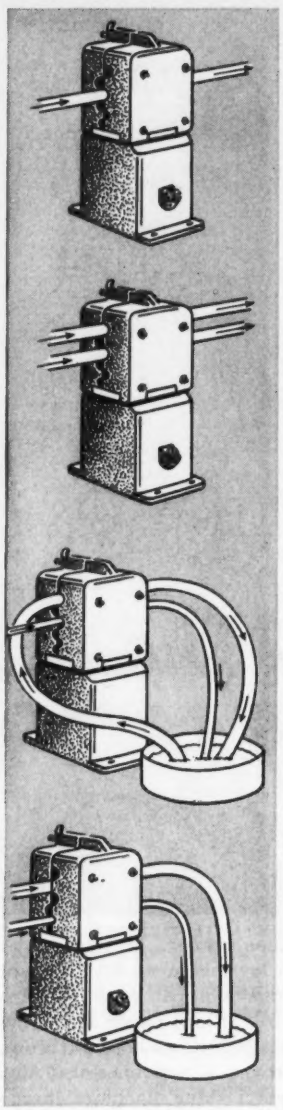
Feed and Mix

One or more tubes can be feeding material to a mix while a larger tube is recirculating the liquid to produce agitation and thorough mixing. Viscous materials can be pumped without danger of gumming or plugging. Remove tube and pump is clean.

Meter Additives

One or more additives can be pumped to a solution in the exact amount desired by selecting the correct size of tubing and regulating pump speed. Various controls can be incorporated to close valves ahead of pump.

Capacities from 0.5 cc. per min. to 4.5 G.P.M.

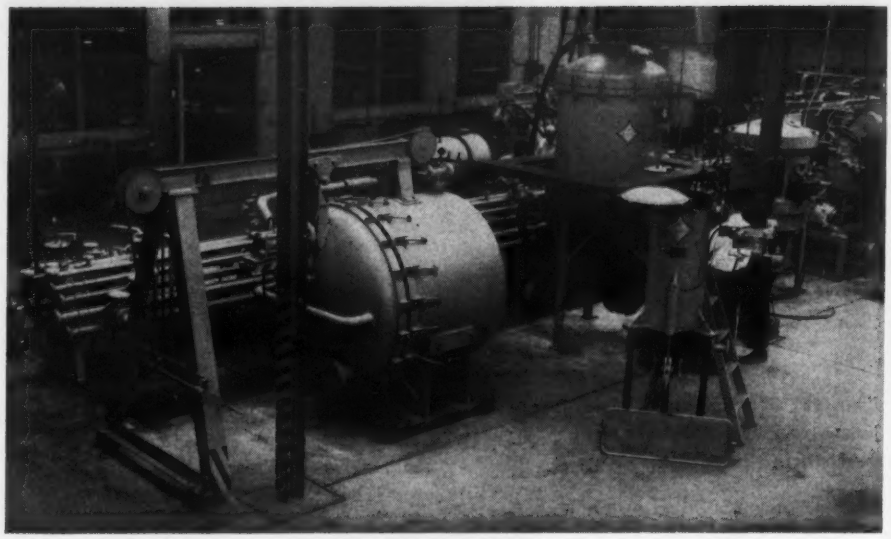


Write for complete information on sizes and capacities.

SIGMAMOTOR, INC.

18 N. Main Street • Middleport, N. Y.

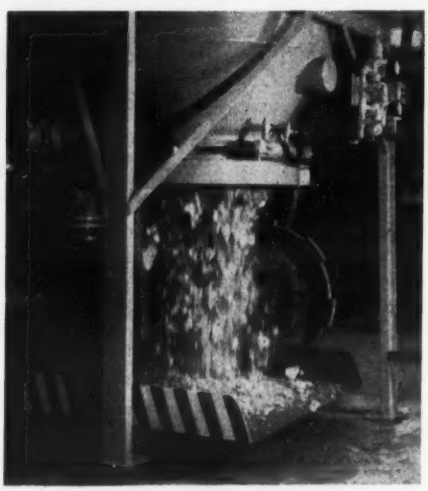
Check 1238 opposite last page



Filter testing and development center can duplicate wide range of plant procedures and process conditions

Which filter is best for a specific job? To help processors answer this question quickly, reliably, and at minimum expense, filter manufacturer has set up a . . .

filter testing center that duplicates full-scale plant conditions



Cake discharging during filter test. Complete automation of filter cycle is possible

Analysis of filtration problems under full-scale process conditions is possible at Industrial Filter & Pump's Research & Development Center. Believed to be one of the most complete installations of its kind for investigating liquid-solid separations, the facility can test effectiveness and operating efficiency of a variety of filters.

Tests can be performed quickly and reliably, under simulated plant conditions. Rapid comparisons of filter types are possible.

Installation utilizes many types of pressure filters including vertical and horizontal, leaf and tubular models. Full-size batch and slurry tanks, heating and cooling systems, and chemical-addition systems permit duplication of wide range of process operating conditions. A 40,000-gal tank below ground level serves for slurry make-up or storage.

Physical and chemical laboratories are

Now... a Powerful New TUBAR DUMPER Specially Designed for Bulk Chemical Containers

The new Tubar Twin-Cylinder Dumper is designed for all-purpose service in paint plants . . . pharmaceutical houses . . . granular plastics . . . and everywhere bulk chemicals are handled. It's built for years of rugged, heavy-duty service . . . cuts chemical container handling costs to the bone. Write for full information and operating specifications.

- **Most models can be made portable**
- **Stops and holds loads at any point in dumping cycle**
- **Optional splash-proof and explosion-proof power features**

UHRDEN is serving industry with a full line of all-purpose and special-purpose dumpers. Standard production models . . . or built to your specifications.

Tubar
DUMPER DIVISION
uhrden, inc.
DENNISON, OHIO
Tubar
ASSURES QUALITY

U-158-39A

Check 1239 opposite last page

used in conjunction with center to provide analysis of effluents and keep tab on densities, viscosities, and other physical properties.

Staff of chemists, engineers, and physicists devoted 7000 engineering hours to 39 projects during 1957. Major portion of this was broken down as follows:

Projects directly concerned with customer's projects and problems	47%
Developmental projects aiming toward new products to solve existing problems in industry	34%
Basic research	6%

Examples of projects handled for clients included: 1) Filtration of plating solutions for an automobile manufacturer, 2) filtering a food product (this required placing steam coils in the filter leaves), 3) handling neutralized waste sludge in minimum available space, and 4) removal of a slimy gelatinous precipitate from a liquid chemical product.

For projects where it is not feasible to bring problem into the center, men and equipment go "on-the-job" to work directly in processor's plant.

Much of work done at center has resulted in published information on filter media, particle retention, and reduced costs of filter aids.

(For more information on R & D Testing Center contact Industrial Filter & Pump Mfg. Co., 5900 Ogden Ave., Chicago 50, Ill.)

Check 1240 opposite last page.

Gas rectification plants

Catalog of 16 pages describes and illustrates rectification plants for the production of oxygen and/or nitrogen in liquid or gaseous form. Technical data are included. Rectification Plants Cat — Superior Air Products Company, 132 Malvern St., Newark 5, New Jersey.

Check 1241 opposite last page.

REINEVELD centrifugals

Reineveld 51" Automatic Centrifuge showing easy access to internal parts.

are used extensively for dewatering and washing of crystalline solids, and for separation and clarification of fine amorphous slurries. Effective bowl capacities range from 3 to 325 gallons. Reineveld is one of the world's largest builders of centrifugal equipment—avail yourself of the services and experience of a leader.

Consult our listing in CEC or write for bulletin 356.

Sold and Serviced by:

Heyl & Patterson INC.

55 FORT PITT BLVD. · PITTSBURGH 22, PA.

Check 1242 opposite last page

Allflex
STAINLESS STEEL
"MNH" FLEXIBLE CONNECTORS

A NEW stock answer to pipeline problems caused by rigid connections.

- Dampens Vibration
- Compensates for Misalignment
- Permits Offset Movement
- Absorbs Expansion

With ALLFLEX Stainless Steel Connectors you get:

- **CORROSION RESISTANCE . . plus**
- **PRESSURE RESISTANCE . . plus**
- **HEAT RESISTANCE . . plus**
- **FLEXIBILITY**

Also available in Monel, Bronze and Steel.

WRITE TODAY for fact-filled ALL-FLEX Bulletin

THESE STOCK SIZES
¼" ⅜" ½" ¾"
1" 1¼" 1½" 2"

IN THESE STOCK LENGTHS
12" 18" 24" 30"
36" 48" 60"

. . . also available in all standard sizes, in any required length, with any standard or special fitting or flange. Full engineering information on ALLFLEX Stainless Steel Hose can be found in: Chemical Engineering Catalog, pages 153 to 156; Refinery Catalog, pages 169 to 172 (Allied A, B, C, D)

ALLFLEX Standard Stainless Steel Connectors are sold through leading Industrial Distributors. If not available locally—THEY CAN BE SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED.

ALLIED METAL HOSE COMPANY

3784 Ninth Street, Long Island City 1, New York

Check 1243 opposite last page

"OUT IN THE OPEN"

vogt

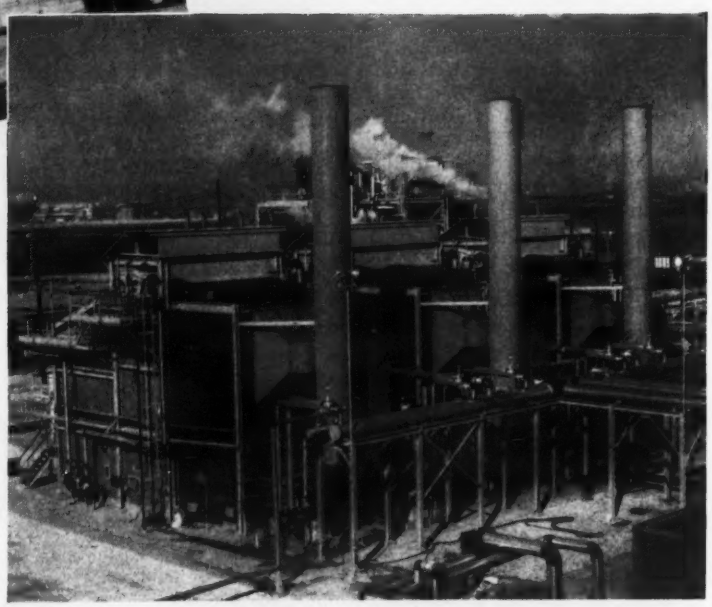
Steam Generators

STEAM GENERATORS for economical outdoor operation have been featured by Vogt for many years and serve leading chemical plants and petroleum refineries. Requiring no building for housing, such installations, as pictured here, produce more steam per dollar of investment and are a definite aid to lower production costs.

Get Vogt's recommendations for steam generators to meet your needs for power, processing, or heating, without obligation. Package type and custom built units are available in a wide range of types, capacities, and pressures to meet operating requirements.

Write for bulletins. Dept. 24A-BCP

Three 85,000 #/hr. steam generators in a Texas refinery.



An outstanding chemical plant served by three 150,000 #/hr. units.

OTHER VOGT PRODUCTS

Drop Forged Steel Valves, Fittings and Flanges —
Petroleum Refinery and Chemical Plant Equipment
Heat Exchangers
Ice Making and Refrigerating Equipment

HENRY VOGT MACHINE CO., LOUISVILLE, KY.

SALES OFFICES: New York, Philadelphia, Chicago, Cleveland, St. Louis, Dallas, Charleston, W. Va., Cincinnati

Check 1244 opposite last page

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Thermonuclear power possible by mixing deuterium-tritium

It may be possible to obtain economically feasible power from controlled thermonuclear reactions using a mixture of the heavy hydrogen istotopes deuterium and tritium at temperatures around 50 million degrees. Use of the mixture would make possible the achievement of thermonuclear power at only one-tenth the temperature required if deuterium alone were used.

There is enough deuterium in the sea to supply a thousand times the present power demand for a thousand million years. However, the problem of obtaining a successful controlled thermonuclear reaction will require a temperature one hundred times greater than that yet reached.

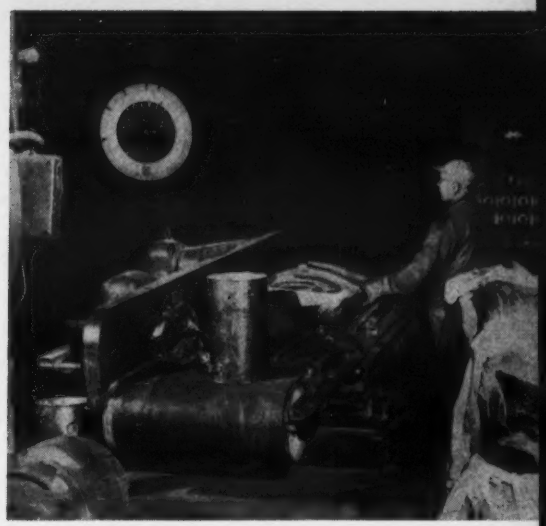
One of the "half-way" stages to achieving this goal might be to use the mixture of deuterium and tritium. Tritium is a super-heavy hydrogen which does not occur naturally, but can be made from the neutrons produced by the reaction itself.

(Based on paper presented at Atomic Energy Management Conference, Chicago, 1958, by Sir George Thomson, Master of Corpus Christi College, Cambridge University.)

Nuclear valves, fittings

Informative bulletin of four pages describes facilities and quality control procedures used to produce cast components designed for 2600 psi service at 670°F. Bulletin covers gate and check valves in sizes from 4 to 16" and fittings, 90 and 45° elbows, tees, and reducers from 2 to 30". Nuclear valves, fittings bul — Nuclear Products Div., Cooper Alloy Corp., Hillside, N. J.

Check 1245 opposite last page.



Photos by CP Staff

Slabs of rubber are weighed on conveyor scale that dumps them into banbury opening (background). Container on end of conveyor contains the preweighed accelerators, anti-oxidants, etc., which operator dumps in last

Dunlop Tire & Rubber switches to semi-automatic weigh-feeding of compounding agents for banbury. Method assures weighing accuracy, is more efficient since . . .

one man does work of two

in banbury charging

DANA B. BERG, Managing Editor
with **WILLIAM MORRISON**
Manager, Mixing and Extruding Departments
Dunlop Tire & Rubber Corp.
Buffalo, N. Y.

Problem: Hand-weighing of the small amounts of accelerators, anti-oxidants, softeners, retarders, and curing agents going into banbury charges was a production bottleneck at Dunlop Tire & Rubber Corp., Buffalo, N.Y.

Two men, the operator and a compounder, were required for the operation of a banbury — including weighing and charging of the rubber, too.

Another bad factor: the ever-present possibility of human error in making the weighings of these crucial materials.

Each No. 11 banbury (there are two of them in this part of the plant) processes 80 batches a shift, three shifts a day. Each batch is 400-425 pounds.

Solution: Late in 1957, Dunlop went over to semi-automatic weighing of these ingredients. A battery of five Glengarry weigh-feeders, for each of the two banburys, dumps preset amounts (set on feeder's scale beam according to formulation figures) into portable stainless steel containers. These containers are then emptied into the banbury. One container, of course, can be filled with as many as five different ingredients.

Closed chutes from upper-level storage bins keep feed hoppers of feeders supplied. Weighed amounts from feeder are held in discharge hopper with pneumatically controlled gate. When operator punches button on front of this hopper, gate opens, dumping charge into portable container. When gate closes again, vibrating action of feeder starts up automatically (according to a preset time delay), putting next charge into discharge hopper.

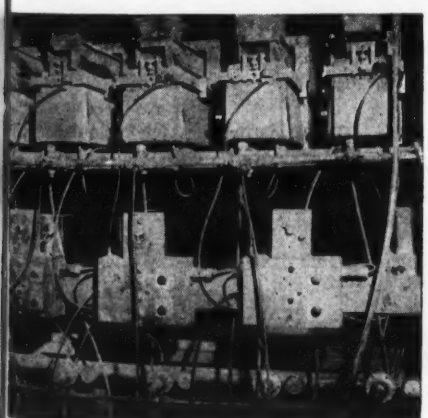
Feeder scale capacity is seven pounds; each feeder can be put on a double-cycle arrangement, however, when more than that must be weighed. Dribble-feed cut-in at end of vibrating weigh-feed assures very high accuracy.

Results: Each of the two banburys is now handled alone by one operator. The two compounders released from this operation have been assigned to other jobs in the plant.

No longer is there any worry about accuracy of weighing; the weigh-feeder is accurate to three grams in its maximum scale capacity of seven pounds.

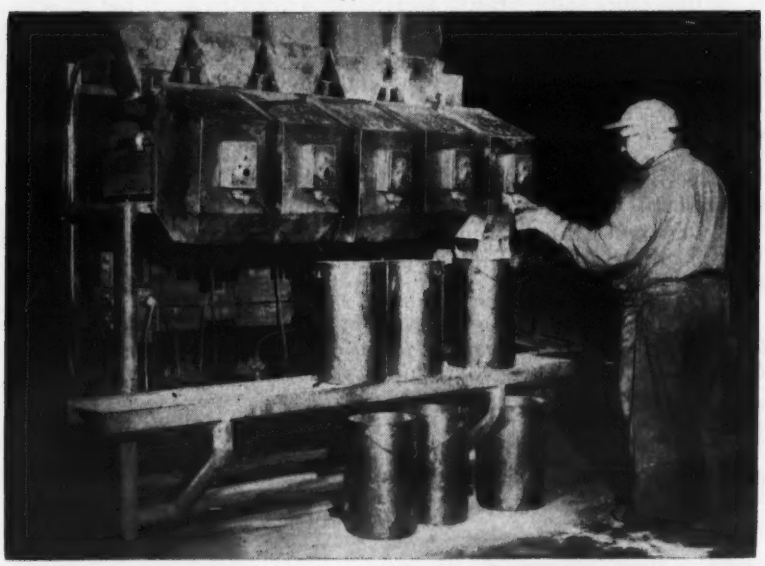
(Weigh-feeders built by Glengarry Processes, Inc., for this application are sold by Farrel-Birmingham Company, Inc., Ansonia, Conn.)

Check 1246 opposite last page.



Back of weigh-feeder panel. Rotary switches on bottom control feeder vibrating intensity for both regular and dribble feed, plus time delay between dumping of front discharge hopper and startup of feeder to weigh out next charge into hopper. Pneumatic lines are for operating discharge-hopper gate

Banbury operator punches button to dump preweighed amount of zinc oxide. Feeder will start weighing out next charge right after dump gate closes. Chutes in background carry material from upper-floor bins to feeders

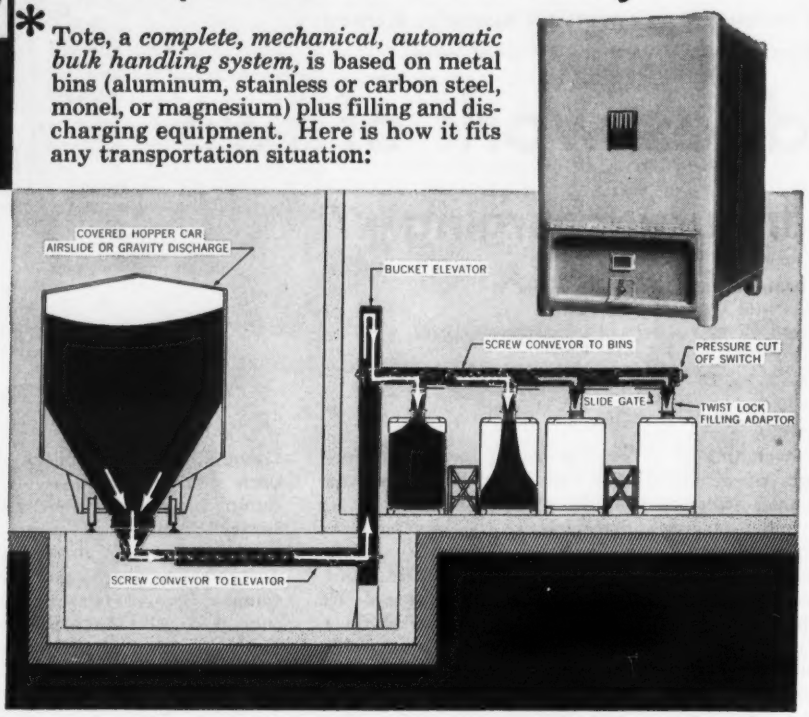


in bulk handling...

TOTE SYSTEM

offers GREATEST transportation flexibility

*Tote, a *complete, mechanical, automatic bulk handling system,* is based on metal bins (aluminum, stainless or carbon steel, monel, or magnesium) plus filling and discharging equipment. Here is how it fits any transportation situation:



BULK HOPPER CARS

Tote System can be adapted readily to the use of bulk covered hopper cars, of the gravity discharge or Airslide type, when these are furnished free by the shipper or by the railroad.

The drawing above shows how quickly and easily mechanical or pneumatic car unloading and Tote filling equipment moves the contents of the car into Tote Bins. The Bins can then be weighed and placed in your warehouse. (Only with Tote can you weigh your incoming material as a check against your supplier's invoice and also for inventory purposes.)

One man can handle the entire operation — unloading the car, filling, weighing, warehousing the Bins, and moving previously filled Bins from warehouse to discharge stations. In many installations, 100,000 pounds of material are being moved through the complete cycle in less than four hours by one man.

CONTAINER CARS

This special railroad car carries 26 Bins which can be filled by your supplier while still on the car. At your plant or team track, one man with a fork lift can unload the car in 35 minutes. A mileage allowance of 3.7 cents is paid for every mile this car travels.

TRUCKS

If bulk hopper trucks are employed, they can be unloaded into Tote Bins by the same method used to unload rail hopper cars. Or up to 16 Tote Bins, depending on weight restrictions, can be carried on conventional trucks and trailers.

Why not let our engineers survey your plant at no obligation? Meanwhile, write for new catalog containing complete details

*Tote and Tote System Reg. U. S. Pat. Off.

TOTE SYSTEM, INC.

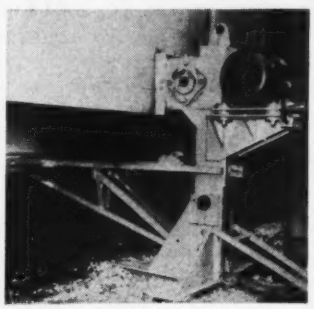
680 SO. 7TH BEATRICE, NEBRASKA

Check 1247 opposite last page

Hopper car shaker attached, operated by one man

Uses: For unloading such materials as silica sands, sulfur, plastic molding powders, cement, ores, and other bulk chemicals commonly shipped in covered hopper cars.

Features: Unit can be attached to hopper car in less than 5 minutes by only one man. Complete unloading operation can also be handled by only one man.



Requiring only one man to install and operate, covered car shaker eases unloading of bulk chemicals

Description: Covered hopper car shaker weighs 1500 lb. Power is supplied by either 5 or 7½ hp triple V-belt drive.

Motor is mounted on base plate insulated from shaker unit by rubber mounts. There is no metal-to-metal contact and motor is not affected by vibration of the shaker.

(Covered hopper car shaker is product of National Conveyor & Supply Co., 357 North Harding Ave., Chicago 24, Illinois.)

Check 1248 opposite last page.

NEXT MONTH

High-speed, fully automatic packaging line at The Atlantic Refining Co. is described in next month's Material Handling & Packaging section. Photo-feature illustrates how Atlantic fills, cases, and palletizes 400 quart cans a minute.

THAT'S INTERESTING

'Fence out' strays

Stray ultra-short waves have hampered testing of microwave devices, greatly in the past. Now, special materials with absorbent qualities deaden troublesome stray waves. An absorbent glass-fiber material can dissipate up to 3 watts/sq in. Low-cost and available in variety of shapes, it permits indoor microwave tests unhampered by weather. (*Poro-Scope*, Pall Corporation)

What next!

An electronic machine that reads a magazine article and then writes an abstract has been developed by IBM. Named "Auto-Abstract," machine is expected to be highly useful in digesting scientific tomes and foreign language articles, and possibly driving present abstractors to distraction. (*ISA Journal*)

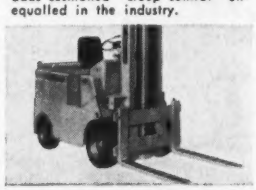
For more information on product at right, specify 1249 see information request blank opposite last page.

Photo Courtesy Scott Paper Co.

Today's industries need Towmotor Continuous Operation

Easy on Mechanics! Towmotor tilt-back seat and slip-socketed side panels permit 23-second access to engine and parts . . . without tools . . . a mechanic's dream!

Easy on Muscles! Towmotor Improved Power Steering triples driving ease; Towmotor TowmoTorque Drive adds cushioned "creep control" unequalled in the industry.



Easy on Operating Costs! New functional-design construction in Towmotor "Pace-Maker" Series adds extra economy to Towmotor Continuous Operation. Model 540 shown.

Stacks high...ducks low..."free lift" tops all!

Safely handling heavy loads, this compact Towmotor lift truck can enter carriers, boxcars and doorways a six-footer ducks under!

Yet Towmotor offers a free lift range that is greatest in the industry. And new Towmotor high lift masts are available that stack goods in tiers over twenty feet tall. Low-cost lifting, stacking and loading are chiefly what you buy lift trucks for, and Towmotor does these jobs best!

Send for 24-page booklet, "What Makes Towmotor Tick?" detailing the superior features Towmotor Fork Lift Trucks offer today. Free Certified Job Studies relating to your business will also be sent on request.

Leaders for 39 years in building Fork Lift Trucks, Tractors and Carriers

TOWMOTOR THE ONE MAN GANG -GERLINGER

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation, Cleveland 10, Ohio

☐ Send "What Makes Towmotor Tick?"

☐ Send free Certified Job Studies relating to our business, which is:

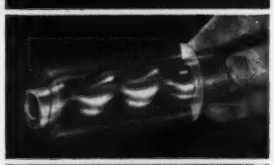
Name_____ Title_____

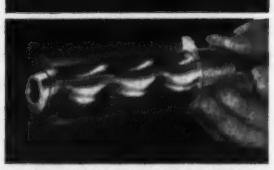
Company_____

Address_____

Mail to **TOWMOTOR CORPORATION**, Cleveland 10, Ohio

MOYNOS®
SLASH PUMP MAINTENANCE COSTS





PROGRESSING CAVITY PRINCIPLE
A screw-like rotor revolves in a double threaded helical stator creating smoothly moving cavities.

Moynos pump "problem" chemicals that ruin other pumps!

Moyno Pumps have increased production and greatly lowered downtime on many chemical jobs where they replaced other type pumps which had run up prohibitive maintenance costs or failed completely.

Moynos can pump any chemical that can be forced through a pipe, whether a thin watery slurry or an extremely viscous material like rubber dough. A rugged screw-like rotor turning inside a double threaded stator forms "progressing cavities" which move chemicals smoothly. Fluids are pumped without turbulence or agitation. Discharge is uniform, nonpulsating.

Moynos last longer on tough chemical duty because the rotor and stator can be made of special materials that resist the tortures of abrasion and corrosion. Moynos need few or no repair parts . . . show little wear, even after long service.

If you are moving chemicals by hand or other expensive means because they're considered "unpumpable" . . . or if you want to decrease present pumping costs on "problem" chemicals, send us an outline of your problem today. Write for your free Moyno Pump Bulletin 30-CP.

ROBBINS & MYERS, INC.
SPRINGFIELD, OHIO / BRANTFORD, ONTARIO

Check 1250 opposite last page

Vibrating screens noisy? Nylon-cord air springs give quieter operation

Uses: Installs on manufacturer's line of floor-mounted vibrating screens to give maximum isolation of vibration, quiet operation, and less maintenance.

Features: Air springs constructed of nylon cord and high tensile strength, heat-resistant compounds provide 98 to 99% vibration isolation, depending on air pressure used. There are no mechanical parts to lubricate or service.

Description: Springs can be adjusted to weight differences by altering air pressure. They can be inflated easily from main air line, portable pressure tank, by pump or air bomb.

Available on manufacturer's floor-mounted vibrating screens in sizes 5 to 12 ft and larger, springs can also be installed in the field on floor-mounted units having dual spring arrangements on each corner.

(Air springs are available from Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis.)

Check 1251 opposite last page.

Tube systems detailed

Detailed information on types of pneumatic tube systems, terminals, and carriers plus interesting photographs of tube systems in industrial plants and other locations are contained in 12-page Cat 12 — Standard Conveyor Co., North St. Paul 9, Minn.

Check 1252 opposite last page.

Pulley advantages

Performance advantages of ceramic permanent magnetic pulley are discussed in four-page bulletin which explains efficiency achieved by "radial pole design." Bul P-1021 — Stearns Magnetic Products Div., The Indiana Steel Products Co., 635 South 28th St., Milwaukee 46, Wis.

Check 1253 opposite last page.

CUT PACKAGING COSTS with INLAND'S INTEGRATED STEEL PACKAGING SERVICE!

The checklist presented below includes important areas in the average packaging operation which should be reviewed to determine whether you are obtaining the most for your packaging dollar.

Check your own operation against this list. You may find that a more economical container can be used for a particular product or that you can effect savings by analyzing your ordering procedure.

If you want additional information on any of the areas listed, check the proper classification and return this form to us. Your Inland representative will contact you to put Inland's Integrated Steel Packaging Service to work.

● ● ● ● ● ● ● ●

Show me how I can reduce costs by analyzing my complete packaging operation. I am specifically concerned with the areas checked below:

1. BASIC CONTAINER CONSTRUCTION

Selecting the right container for the product to be shipped.

- ☐ type of steel (carbon, stainless steel, galvanized)
- ☐ capacity (drum or pail of proper size)
- ☐ most efficient closures (e.g., covers, gaskets, spouts, plugs and flanges)
- ☐ special basic container requirements (e.g., location and number of beads or rolling hoops)
- ☐ other (indicate)_____

2. CONTAINER INTERIOR LININGS

Finding correct linings to overcome problems of shipping specific products.

(indicate product/s)_____

(indicate requirements)

- ☐ maintaining product quality
- ☐ maintaining product color
- ☐ other_____

3. EXTERIOR DECORATION OF CONTAINERS

Planning for the most effective exterior finish and design of container to fit marketing situation.

- ☐ deciding upon most effective exterior design (e.g., for advertising product brand, for building family identification of products, for product use instructions)
- ☐ determining most efficient method of finishing exterior of container (e.g., lithography, silk screening, rubber plate printing, painting, striping)
- ☐ other_____

4. PROCUREMENT AND HANDLING OF STEEL CONTAINERS

Increasing efficiency of ordering, storing and in-plant handling of containers.

- ☐ how to order most economically
- ☐ warehousing containers
- ☐ stacking and palletizing
- ☐ outdoor storage
- ☐ U.S. Government packaging specifications
- ☐ other_____

5. PACKAGING & SHIPPING PRODUCTS IN STEEL CONTAINERS

Planning for most efficient packaging and shipping procedures

- ☐ improving filling operations
- ☐ increasing efficiency of closing operations and equipment
- ☐ information on ICC and other applicable specifications for the shipment of specific products in steel containers

other _____

Name_____

Title_____

Company_____

Address_____

City_____ State_____

INLAND STEEL CONTAINER COMPANY

6532 South Menard Avenue, Chicago 38, Illinois

Member of the INLAND Steel Family

Plants: Chicago • Jersey City • New Orleans • Cleveland & Greenville, Ohio

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

Tear out here, fold along dotted lines, seal and mail.

Postage
will be paid by
Addressee

No postage
stamp necessary
if mailed in the
United States

BUSINESS REPLY ENVELOPE
First Class Permit No. 2261 Chicago, Ill.

INLAND STEEL CONTAINER COMPANY
Customer Service Department
6532 South Menard Avenue
Chicago 38, Illinois

THAT'S INTERESTING

Fore!

United States Golf Association Rules specify a test in which the ball shall not travel faster than 250 ft/second. If the ball were much livelier, golf courses would tend to lose their challenge to the player. According to tests, velocity of the ball seems to depend more on how squarely, rather than how hard, the ball is hit. (*Industrial Bulletin*, Arthur D. Little, Inc.)

Plastics makes perfect

Divining a lost art? Who said so? Douser working out of Norwood, Ohio, has added a divining rod of oil-derived plastic to the art. He says it tops the old style peach twig for spotting subsurface water. (*Our Sun*, Sun Oil Company)

For more information on product at left, specify 1253A see information request blank opposite last page.

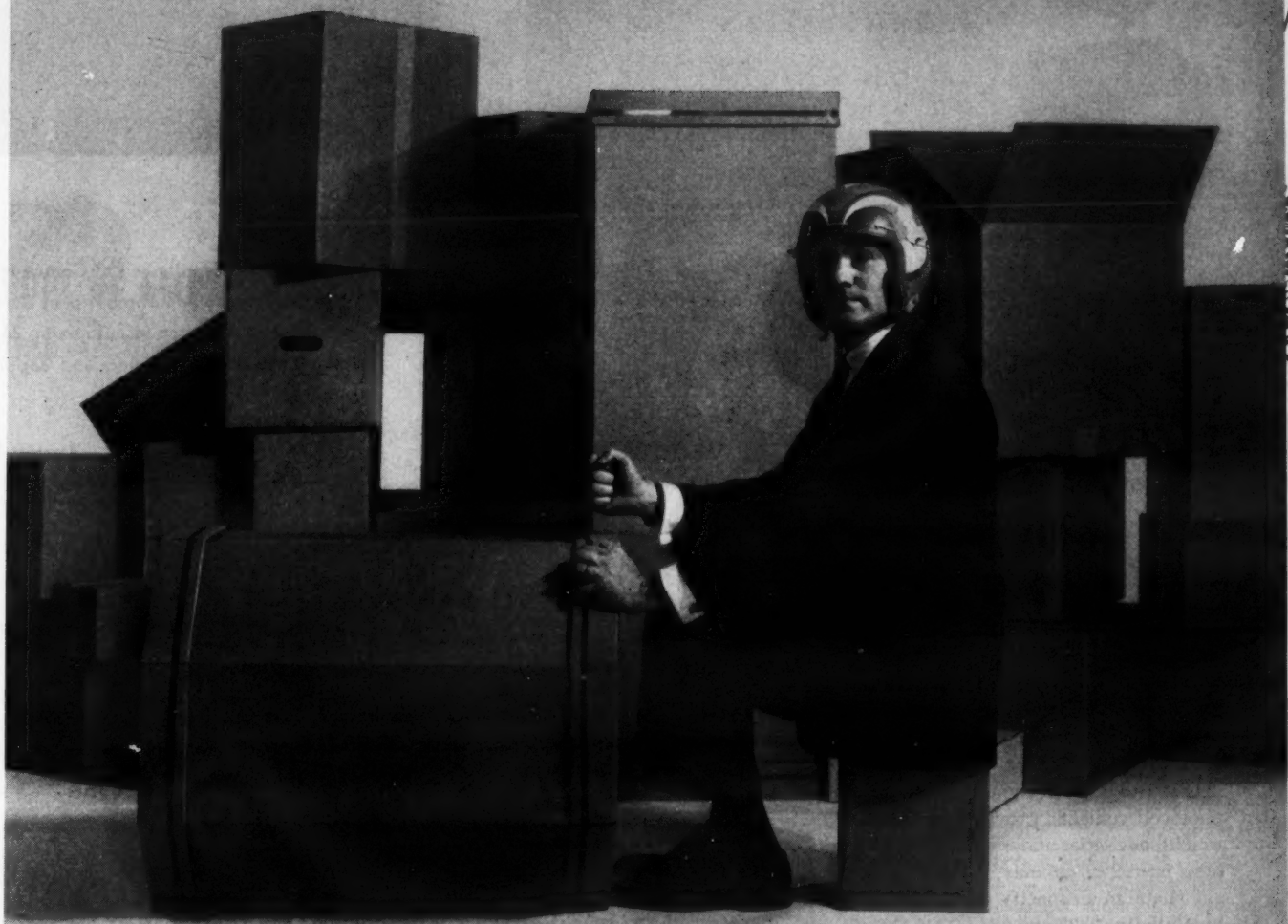
For more information on product at right, specify 1254 see information request blank opposite last page.

GAYLORD PILOTS YOU TO JET-AGE PACKAGING

Looking for ways to up-date your packaging procedures? Your Gaylord pilot can help you speed production, increase product protection and improve promotion. At down-to-earth packaging costs.

Precision corrugated boxes by the millions or engineered packaging, Gaylord is skilled in both. Case histories? Roger and over . . . to your G-Man.*

**Your Gaylord Man—of course*



GAYLORD CONTAINER CORPORATION

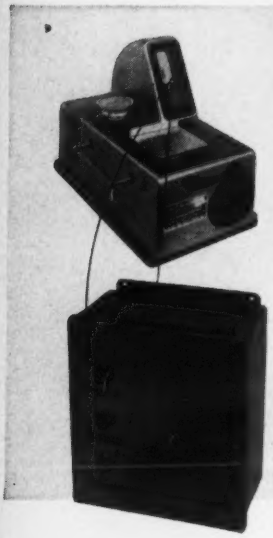
Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

BASIC WEIGHT CLASSIFIER

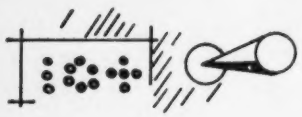
...new aid for controlling your quality and costs



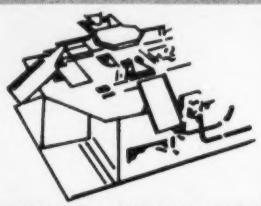
CHECKWEIGHS products packages and assemblies

CLASSIFIES by weight

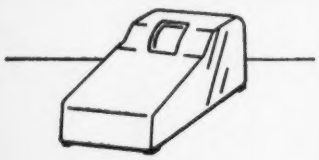
. . . and through electronic controls, performs these and many other remote functions!



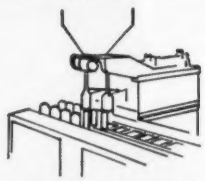
OPERATES SIGNALS



ACTUATES MECHANISMS



RECORDS DATA



CONTROLS PROCESSING

Now you can checkweigh or classify items by weight and utilize the data wherever you need it — and in the form that best fits your needs. The Basic Weight Classifier, employing Shadograph Scale with photocell controls, provides electronic signals which indicate correct weight, or over or under within pre-set limits. Any number of classifications from 2 to 128 may be used. Units are available to handle items in any shape in a capacity range from 2,000 milligrams to 100 lbs. Write for Bulletins 3333 and 3347.

Exact Weight SCALES

THE EXACT WEIGHT SCALE CO.

905 W. FIFTH AVE., COLUMBUS 8, OHIO

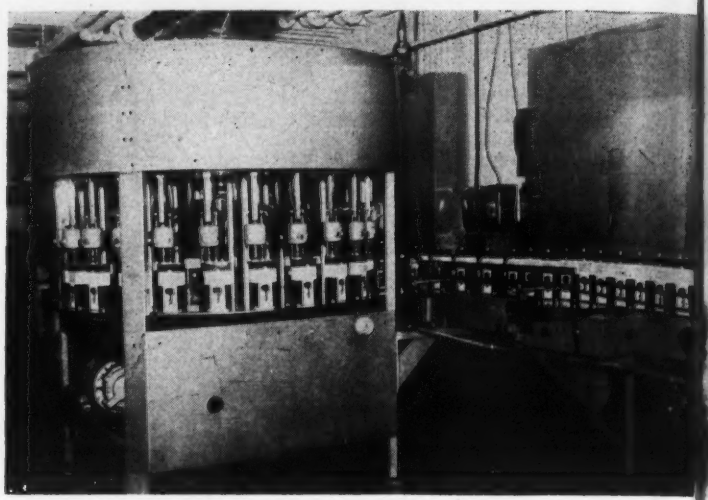
In Canada P.O. Box 179, Station S, Toronto 18, Ont.

Sales and Service Coast to Coast

Find us in your local 'Yellow Pages'

BETTER QUALITY CONTROL . . . BETTER COST CONTROL

Check 1255 opposite last page



McColl-Frontenac Oil Company Limited, Toronto, Ontario, could not meet peak demands with existing filling line. Switch to automatic, 24-head, rotary filler plus automatic inner-sealing and capping machines . . .

GEORGE V. MICHAEL, Assistant Editor
With **NORMAN E. TAYLOR,** Superintendent
Toronto Terminal
McColl-Frontenac Oil Company Ltd.

Problem: In summer months, demand for motor oils in one-quart and two-gallon (Imperial) screw-top cans would increase to point where McColl-Frontenac Oil Company Limited's Toronto Terminal found it almost impossible to meet demand with existing filling line. Firm is Canadian manufacturer and distributor of Texaco petroleum products.

Cans were filled on dual-head filling machines — one for each can size. Inner-sealing and capping were being done by hand. Considerable labor costs were involved in entire filling operation.

Solution: Faster, automatic filling machine was installed in conjunction with automatic inner-seal and screw-cap machines to make up filling line which would meet peak demands.

Filling unit is a 24-head, vacuum-gravity, rotary machine which will handle cans from one pint to two gallons (Imperial). At present it is being used for only one-quart and two-gallon cans. Motor oils from grade SAE 10 to SAE 50 are handled on the line.

Cans enter machine through worm feed that spaces them properly to "star" wheel feeding onto circular rotating table. Nozzles are automatically lowered into cans to form an air-tight fit. As nozzle enters can, filling valve is automatically opened. Vacuum is then drawn on can and filling takes place as can moves around table.

After filling, nozzle is withdrawn, and cans, via another star wheel, continue down a slat-chain conveyor to inner-seal and screw-cap machines.

Rotary, 24-head, vacuum-gravity filling machine is feature of automatic filling line for handling one-quart and two-gallon screw-top cans of various grades of motor oils

Filling machine (left), with reported accuracy of plus or minus ¾%, delivers filled cans to automatic inner-seal and capping machines

doubles filling of screw-top cans to meet peak demands

Filling machine is designed for approximately 120 quarts per minute, but line is now based on speed of screw capper and runs about 50 quarts or 12 two-gallon cans per minute.

Machine uses conventional left-to-right feed. Low-friction-polyethylene worm feed avoids damage to container and lithography.

Operating on a combination gravity-vacuum principle, unit can also be operated as straight gravity machine. Fine fill-height adjustment can be made while machine is in operation by merely turning a crank. Same crank effects major height adjustment when changing over from one container size to another. Unit embodies no-container, no-fill principle. Fluid drive assures even starting and stopping.

Vari-speed drive permits filling operation to be timed to operate in unison with other equipment on line.

In addition to raising or lowering filling nozzles to change to different size cans, it is also necessary to change screw worm on feed-in end, the star wheels, and heads on inner-seal and screw-cap machines. Guide rails along slat-chain conveyor have to be adjusted. Change-over takes about two manhours for filler, and two manhours for inner-seal and screw-cap machines.

Results: Quart-can output from present line, including filling and packaging, is more than double that of old line. It now runs about 13 cases per manhour. Two-gallon output is almost double that of old line, present rate being about 22 cases per manhour. These speeds indicate net throughput, and include downtime for change-over between grades and can sizes.

McColl-Frontenac figures machine's accuracy is about ±¾%. Cans are spot-checked during the run on a check-weight scale accurate to ¼ ounce.

Machine's ease of cleaning allows thorough cleansing job

To page 164

TRAVELLING CHEMICALS

arrive in style

in CONTINENTAL steel containers

Ship your chemicals the safe, sure way—in Continental steel containers. In addition to the highest quality containers, you get all the benefits of famous Continental service. You choose from Continental's complete line, guided by a Continental expert who knows the chemical industry. You get fast delivery of all the containers you need. For hard-to-hold chemicals, Continental Perma-Lined containers guarantee you 100% protection. And Continental's engineering and research services are ready to help you solve any problem. Give Continental a call—today.

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

Check 1256 opposite last page

How proper equipment selection results in . . .

MORE PRODUCTION PER MAN HOUR

With constantly rising labor costs, alert manufacturers have begun programs designed to *increase the productivity* of labor per hour through better planning, better methods and better equipment. In materials handling particularly, increased efficiency and more productivity per man hour can result in substantial savings in over-all production costs.

New Tractor-Shovel Designs

As an example of what is taking place in the bulk-material handling field is a new tractor-shovel recently introduced by The Frank G. Hough Co. The new "PAYLOADER" model H-25 has practically the same physical dimensions as its predecessor, the Model HA, yet it will carry 2500 pound loads as compared to the previous carry capacity of 2000 lbs. This means that the same operator picks up and carries 25% more material each trip — or you have increased your operator productivity by 25%.

Ease and Speed of Handling

Equally important are faster traveling speeds, a selection of gear ratios; easier operation and quicker maneuvering, because these factors affect the number of trips the operator can make. Obviously the more trips back and forth the operator makes, the more material he delivers per hour.

Power-steer and power-shift ease operator effort, speed the work cycle and boost production per man hour.

Torque converter drive gives easy, accurate "inching" control for close-quarter work. No tiring foot clutch.

More carrying capacity per load, and more loads per shift step up operator productivity substantially.

Again referring to this machine, the inclusion of power-steering; full-reversing, two-speed-range, power-shift transmission; torque-converter; plus simplified control cut operating cycle time substantially . . . resulting in more trips per hour with far less operator fatigue.

It all Adds Up to More Production

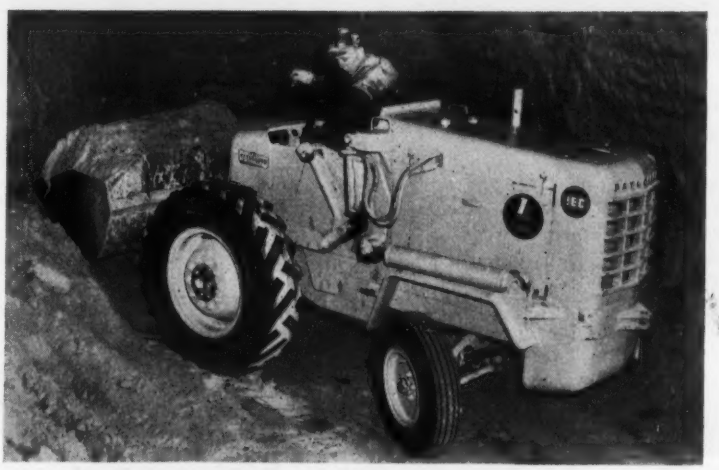
By carrying more material per trip and by making more trips per hour, the productivity per man hour is increased substantially with resulting savings in over-all costs.

What Size Machine For Your Job?

How much material do you have to move per hour or per shift? How far must it be moved? Will it be done indoors or outdoors? Do you need extra-high dumping clearance to fill bins or vats? Are there jobs in addition to bulk material handling that the machine can do? These are some of the questions that are involved in the selection of a tractor-shovel or *any* bulk material handling system.

The wide selection of "PAYLOADER" tractor-shovels — 7 sizes with carry capacities from 2,000 to 9,000 lbs. — plus the different types and dumping heights that are available make them applicable to many more bulk-handling jobs than ever before. In addition, the choice of available attachments is greater than ever — attachments that enable a "PAYLOADER" to do many other handling jobs. There are crane hooks, side booms, lift forks, log grapples, hydraulic scrap grapples, backfiller and snow blades, snow plows, pick-up sweepers, back-hoes and others.

Your Hough distributor is ready to show you how you can get more production per man-hour with the new H-25 or a larger "PAYLOADER". Ask him about Hough Purchase and Lease Plans too. The Frank G. Hough Co., 744 Sunnyside Ave., Libertyville, Ill. 9-A-1



Use one man and larger "PAYLOADER" units like this model HAH (3,000 lb. carry capacity) when working space permits.

Big 4-wheel-drive units carry up to 4½ tons . . . go "anywhere" . . . dump over bin and hopper edges up to 12 ft. high.

For more information on product at left, specify 1257 see information request blank opposite last page.

Durable answer to you who have asked for a

husky sectional belt conveyor

ANSWERS STORAGE PROBLEM — Using Link-Belt Pre-Bilt belt conveyors to stockpile material 40 feet high, this efficient layout using a radial belt stacker has overcome the restrictions of limited area. System has to operate continuously up to 60 hours, or more.

LINK-BELT Pre-Bilt Belt conveyors handle up to 1500 tons per hour

Per pound of weight, no other sectional belt conveyor tops the strength and rigidity of Link-Belt Pre-Bilt Sectional Belt Conveyors.

For full information on these durable conveyors up to 36 in. wide—with drives up to 40 hp, 24 and 42-inch truss depths or simple channel stringer type — contact your nearby Link-Belt office.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

From selection to erection . . . you save every step of the way with quality pre-engineered equipment

NO DETAILED DRAWINGS—From standardized data, a Link-Belt engineer will prepare an "on-the-site" quotation covering the components for your needs.

LOWER PURCHASING COSTS—Interchangeability and standardization reduce costs and speed selection of parts . . . all available from Link-Belt.

NO COSTLY DELIVERY DELAYS—PRE-BILT conveyors are built at eight strategic locations and are shipped from the plant nearest you to assure prompt delivery.

QUICK LOW-COST INSTALLATION—Simple construction and shop-assembled components facilitate field assembly and installation by your own or Link-Belt erectors.

MINIMUM OPERATING COST—These conveyors require a minimum of power for the tonnages of materials handled. Maintenance normally consists only of lubrication.

Check 1258 opposite last page

Filling Screw-top Cans

From page 161

for running different products. An automatic pumpback overflow system assures no waste of product.

Maintenance of machine is easy too, as oiling is accomplished by one-shot automatic system. Central grease panel handles required lubrication.

(Series #51 filling machine is manufactured by International Filling Machine Corporation, Petersburg, Va.)

Check 1259 opposite last page.

No expensive alterations; automatic dockboard bolts on truck dock

Eliminates dock attendant

Uses: Providing automatic ramp from dock to trailer.

Features: Unit provides first low-cost permanent solution to existing dock height problem. No expensive dock alterations or construction are required.

Description: Fully automatic dockboard is installed by simply bolting to top of existing dock. Counterbalancing system is mounted on face of dock between two bumpers. No electrical, air, or hydraulic power is required.

Dockboard design permits installation on existing truck docks without expensive alterations

Backing truck automatically lowers ramp to working position. After loading operations are completed, ramp automatically returns to its original position, ready to service the next carrier. No dock attendant is needed.

Entire adjustable ramp section tilts automatically to compensate for uneven truck beds. When installed under an overhead door, bottom of door is notched or equipped with

closure strips. Standard models are 6′ wide and 8 or 10′ long, with roll-over capacity of 12,000 lb.

(Hi-Lo automatic dockboard is product of Kelley Company, Inc., 2111 West Mill Rd., Milwaukee 9, Wis.)

Check 1260 opposite last page.

Handling corrosive babies? acid perambulator does the job safely

Uses: Transporting and distributing corrosive materials.

Features: Unit increases safety in corrosive materials handling. It eliminates waste and prevents damage often caused by breakage and spillage of corrosive chemicals.

Description: Mobile "acid buggy" is convenient for in-plant material handling and interplant hauling. Unit is

"Acid buggy" reduces hazards in handling of corrosive materials — can be used for temporary or permanent storage

available in 100-, 200-, and 425-gal capacities with alternate sizes custom-built. It may be used for temporary or permanent storage.

Materials of construction are steel plate, stainless steel, and aluminum. Insulations available are: natural and synthetic rubbers; vinyl plastic; Hypalon; Teflon linings; epoxy and other coatings. The motor is totally enclosed and pump hose is acid resistant with bib cock.

(Acid buggy is manufactured by Automotive Rubber Co., Inc., 12550 Beech Rd., Detroit 39, Michigan.)

Check 1261 opposite last page.

PROTECTIVE'S
SUCCESS!

The First and The Best
"POWER-SEAL"*
ROUND
PLASTIC LINERS
FOR
DRUMS · CANS · PAILS
and SPECIALTIES
All Diameters · All Heights

SCIENTIFICALLY sealed **POLYETHYLENE,** Mylar, and Copolymer Vinyl—with guaranteed safety.

PERFECTLY made to insert easily and fit exactly all types of ROUND CONTAINERS.

EFFICIENTLY made for top tie-off; for peel-over with separate disc-top -cover; or with spouts, including our special HEAVY DUTY "ALL-CHEM"* LINER for attachment to Rieke Flexspout.

LOGICALLY made to solve "square pegs in round holes" with simplified round-liners to fit ROUND CONTAINERS—ECONOMICALLY.

Write, wire, or 'phone us collect—for information and free samples.

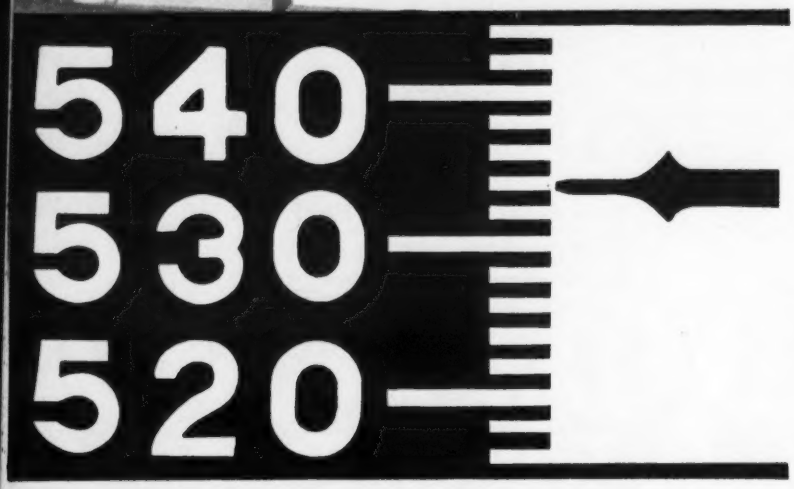
PROTECTIVE PLASTIC PACKAGING PRODUCTS FOR INDUSTRY

PROTECTIVE
LINING CORPORATION

Check 1262 opposite last page

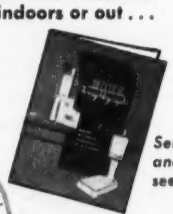
HOWE WEIGHTOGRAPH

READ WEIGHT IN NUMBERS THIS BIG



NO MORE "SCALE SQUINT!"

Pin up this ad and look at it from across the room—see how easy it is to read the weight! You can attach a Howe Weightograph to any beam scale, from small bench scales to the largest truck and railroad scales; different models available for different capacities. Standard models plug into ordinary electric outlet. So much easier, faster, more accurate, it quickly pays for itself. Use indoors or out . . . adjusts to eye level . . . parallax errors are completely eliminated.



Send for this detailed booklet and local representative's name—see the Weightograph demonstrated!

HOWE

THE HOWE SCALE COMPANY • RUTLAND, VERMONT

A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

ELECTRICAL DIVISION • ENTOLETER DIVISION
LIGHTING DIVISION • AUTOMATIC TIMING & CONTROLS

Check 1263 opposite last page

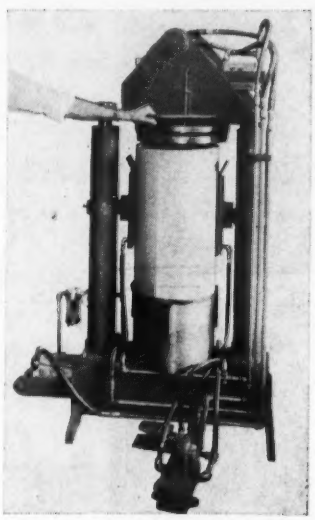
HANDLING & PACKAGING

Drum release coating facilitates stripping from solid product

Stops contaminating particles from adhering

Uses: For shipping products that are packaged hot and then solidified upon cooling.

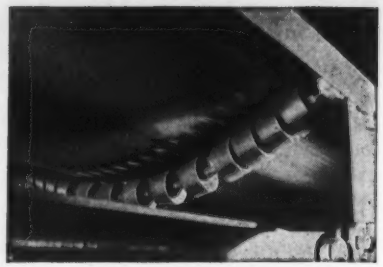
Features: Drum is lined with special release coating that prevents any contaminating particles or board fibers from adhering to asphalt, wax, and rosin when drum is stripped away. Coating is effective even when drum is filled with products registering temperatures as high as 500°F; it does not lose its characteristics after long period of aging.



Bottoming machine developed by manufacturer glue-seals bottom disc to side walls of specially treated drum

Fiberboard drum can be easily and cleanly peeled away from product. According to manufacturer, drum is said to be lighter in weight yet stronger than conventional containers, and is completely leak-proof along side and bottom.

Description: Made of virgin kraft fiberboard, drum has specially designed side closure that gives more positive leak proofness and greater strength by eliminating need for metal stitches. Closure prevents any seepage or leakage that so often causes waste and mess



NEW CONVEYOR BELT IDLER

Handles sticky, abrasive, dusty, or corrosive materials
Has only two bearings—up out of the dirt.

A 2-bearing, cable suspension idler that resists dust, abrasion, corrosion and material buildup is proving itself superior for bulk handling in many industries.

Called the Limberoller, it has already given 21 *times* the service life of replaced steel idlers in handling abrasive foundry sands, coal, petroleum coke, potash, copper ores, copper mill tailings, iron ore, wet concrete, triple super phosphate, ammonium sulphate, and sticky fertilizers.

Pressure-molded neoprene or rubber discs on a flexible steel cable conform to load and cushion the belt, help keep belt aligned, and are self-cleaning. The two bearings are up out of the dirt zone; have had no design failures.

Unaffected by most corrosives that damage steel, the new idler is ideal for chemical, sulphur and salt plants; corrosive and high ozone atmospheres. It is more abrasive-resistant than steel and flexes out of the way of abrasive materials.

The Limberoller weighs ⅔ less than a conventional steel idler; is locked by a simple cotter key into special lightweight stands for easy installation and removal. No cover sheets are needed. Two types of stands are available: one that bolts to conventional rigid sections; and a self-supporting type that forms its own easily-erected, portable sections without bolts, by using special stiffening rails.

Because of these unique features, many companies have adopted Limberollers as standard for all belt conveyor operations. Details from *Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa. Request Bulletin 24-80.*

Check 1264 opposite last page

USE THE
POWER TRUCK ATTACHMENT
LIFT-O-MATIC
for
HANDLING DRUMS
with a
POWER
FORK TRUCK
WITH FORKS LEFT ON
OR
REMOVED

Simple, automatic, mechanical handling of any size or type of drum—single or multiple.

WRITE FOR CATALOG
MARVEL INDUSTRIES, Inc.
2234 CLEVELAND ST., EVANSTON, ILLINOIS

Check 1265 opposite last page

modernize with
HydroLectric
A GREAT NAME IN LIFT TRUCKS

- Two driving wheels instead of one
- Braking with handle in any position
- Automatic parking brake (optional)
- Sealed alloy gears instead of chains
- Sealed ball-bearing rollers in masts
- 100% more steering ease with two wheel drive
- Power unit removal complete in 20 minutes
- Greater tire capacity equivalent load ratings

The only truck with 2 driving wheels and 2 braking systems. In fact Hydrolectric does everything a good lift truck should do.

LIFT TRUCKS, INC.
2427 Spring Grove Avenue
Cincinnati 14, Ohio

STUEBING *Designed Engineered • Built*

There is a truck for every purpose to handle any kind of material.

Check 1266 opposite last page

at filling point and personal hazards from burns. Closure consists of 1", full overlap, glued seam and an additional 2", glued extension of outer ply of virgin kraft.

Bottom disc of drum is made of extra-heavy fiberboard and can either be stitched into place or glue-sealed at point of assembly. Tabs at bottom are an added insurance against leakage at this critical point.

Manufacturer has developed bottoming machine that glue-seals drum walls to bottom disc. Machine permits operator to assemble two or three drums every minute. After drum walls and bottom disc have been mounted on a mandrel, machine head is pulled into place. Through hydraulic pressure the side walls are crimp sealed to a disc on which a measured amount of adhesive has been mechanically applied. Machine then ejects the completed drum.

("XLO" drum is development of Excello Paper Products Co., div. of The Mead Corporation, 118 West First St., Dayton 2, Ohio.)

Check 1267 opposite last page.

Uneven floor conditions . . .

. . . are overcome by two high-lifting hand trucks which feature articulated drive unit that raises or lowers three inches. This prevents loss of traction. Battery-powered hand trucks are designed to handle single-face pallets or have platforms available in lengths from 36 to 60". Both units will lift a 4000-lb load 130" or more, depending on application. Overall width is 42½". "Powrworker" trucks are product of Industrial Truck Div., Clark Equipment Company, Battle Creek, Mich.

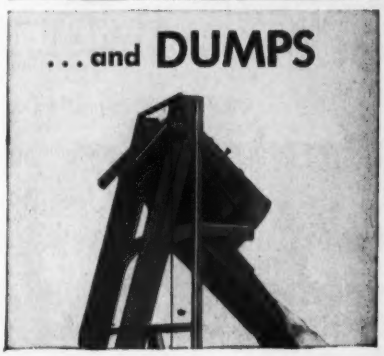
Check 1268 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Here's a REAL LABOR SAVER!

THE CESCO DUMPER

. . . and DUMPS



Provides Easy, Safe Loading of
BINS • BATCHERS • MIXERS

HANDLES DRUMS, BAGS, BULK, BARRELS and BOXES

Speed up materials handling with Cesco Skip-Hoist Dumpers. They lift, upend and dump up to 100 loads per hour, and have a capacity of up to 3000 lbs. Available in single or multi-purpose portable models in standard height from 4 to 15 feet. Stationary models to 20 feet.

Dumpers Engineered to Meet Special Applications.

Write for complete catalog

ESSEX CONVEYORS, INC.
Dept. B, 165 Franklin Avenue, Nutley 10, N. J.

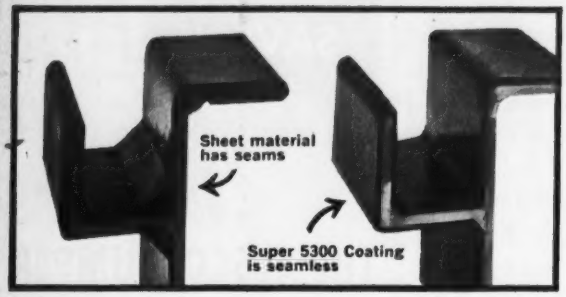
COLSON EQUIPMENT & SUPPLY CO.
1317 Willow Street, Los Angeles 13, California

CESCO DUMPERS

Check 1269 opposite last page

Unichrome "Super 5300" Coating

SEALS OUT CORROSION



No seam problems with Unichrome "Super 5300" Plastisol Coating. It *sprays* on, protecting even sharp bends and complex shapes with a seamless, pore-free lining.

A vinyl material, "Super 5300" resists acids, alkalies, moisture and other active agents. It's applicable as thick as 60 mils per coat, forming a resilient, heavy-duty, impact- and abrasion-resistant skin . . . maintains tight "seal" under severely corrosive conditions.

Unichrome "Super 5300" Plastisol can be applied in-plant or by experienced applicators in key locations. Write for more data.

METAL & THERMIT CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ontario

Check 1270 opposite last page

Permanently End Condensation Drip, Rust and Corrosion with NoDrip Plastic Coating!

Here is the inexpensive, easy way to solve your condensation problem once and for all. NoDrip plastic coating acts immediately to insulate and protect tanks, pipes, walls, ceilings, air ducts and other metal equipment against condensation drip, rust and corrosion. NoDrip can be applied by anyone without special experience with brush, trowel or spray. NoDrip is also resistant to acid, alkali and brine... protects concrete, brick, plaster, tile, wood or composition surfaces.

32-PAGE NoDrip DATA HANDBOOK Complete with photographs, charts and technical information to help solve your condensation problem. Write today!

Available at leading plumbing and mill supply houses
J. W. MORTELL COMPANY, 530 Burch St., Kankakee, Ill.

Check 1271 opposite last page

CP CORROSION CONTROL

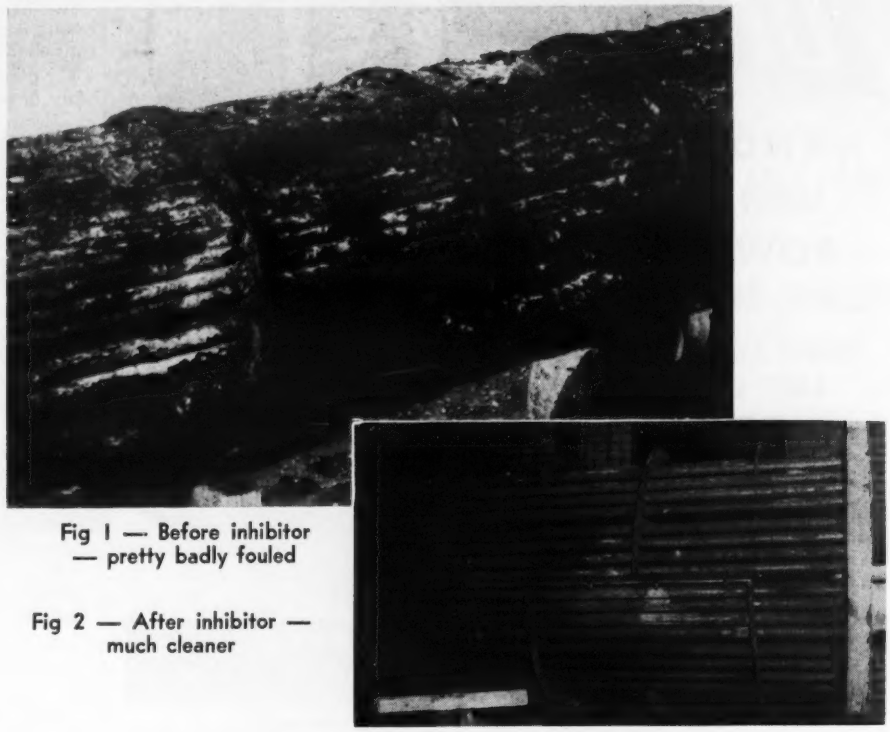


Fig 1 — Before inhibitor — pretty badly fouled

Fig 2 — After inhibitor — much cleaner

Chemical stops fouling and corrosion

Recently announced chemical treatment for refinery crude lengthens time on stream, reduces turnaround maintenance costs, and prolongs equipment life

A copper-ammonia complex crude oil conditioner, called Cronox C®, is giving promising results in regular use in four refineries. Visual evidence of the ability of the treatment to remove primary causes of fouling and corrosion is apparent in accompanying photos of two gasoline cooler bundles used in one of these refineries. In Fig 1, condenser tubes are badly fouled and corroded after processing 1,000,000 bbl of naphthenic coastal crude during a nine-month period. It was necessary to overhaul and rebuild this bundle before it was returned to service.

Fig 2 shows cooler bundle which was protected by the inhibitor. After a run of 18 months, processing 2,000,000 bbl of the same crude, the bundle is much cleaner. Only hosing was required to return bundle to service. Hence, unit was twice as long on stream, turnaround maintenance was less, and tubes were in much better condition.

Inhibitor, which is a liquid chemical concentrate, is injected into desalted feedstock in conjunction with soda ash and water. Within the crude unit, fouling and corrosive agents are removed from the hydrocarbon stream without affecting existing processes, equipment, catalysts, or products.

Conditioner rids crude of dangerous impurities through its ability to scavenge oxygen and neutralize acids. Removal of

oxygen retards hydrogen sulfide corrosion and prevents formation of fouling deposits. Acid neutralization prevents corrosion due to hydrochloric, naphthenic, and other acids. Protection is provided to the crude unit itself — preheat exchanger, crude heater, bottoms exchanger, tower and overhead equipment. In addition, purified hydrocarbons are less capable of causing fouling or corrosion in units downstream.

Cost of treating crude with the inhibitor is about 1.5 mills per barrel of throughput. No control procedures or processing equipment is necessary to use inhibitor. Feed system for injecting conditioning solution is built from equipment refineries normally have on hand.

(Cronox C conditioner is product of Atlas Powder Co., 3272 Westheimer Rd., Houston 6, Texas.)

Check 1272 opposite last page.

Gives instantaneous readings for determining corrosion rates

Uses: Indicating relative corrosion rates.

Features: Portable corrosion meter is battery-operated, and batteries will last at least six months. Unit has single-knob control, and readings indicate corrosion rate directly in micro-inches.

Description: In operation, probe is inserted in corrosive environment. As corrosion takes place, resistance of exposed strip increases. With completely transistorized Wheatstone bridge circuit, log-voltage AC power is applied to probes. Loss in thickness of probe is indicated directly on single dial.

Large assortment of probes is available — made of steel, nickel, tin, Monel, aluminum, copper, stainless steel, bronze, and lead.

(Corro-Dex corrosion meter is manufactured by Labline, Inc., 3070-82 W. Grand Ave., Chicago 22, Ill.)

Check 1273 opposite last page.

BLUE-dyed Asbestos tells you that your Flexitallic Gasket is

RIGHT FOR A GIVEN SERVICE

Practices in design and construction make Flexitallic Gaskets different from others in the spiral-wound industry. In Flexitallic Gaskets, the compression characteristics for a given pressure series are *always* related to the bolting load for that series.

Once the design is right for a given service, Flexitallic Gaskets are made under exacting mechanical controls to assure that manufactured gaskets conform to specification.

The blue dye in the Canadian asbestos filler indentifies Flexitallic Gaskets for engineers who want the right gasket for each sealing requirement.

Whatever the service conditions may be—vibration, weaving, thermal and mechanical shock, and other joint stresses—the precision design and construction in Flexitallic Gaskets are your assurance of satisfactory service.

FLEXITALLIC GASKET CO.
8th & Bailey Sts. Camden 2, N.J.
Representatives in principal cities

Flexitallic®
SPIRAL-WOUND GASKETS

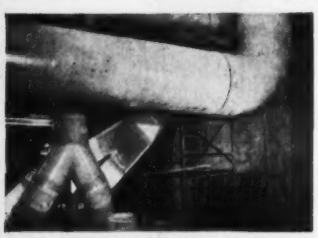
FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue* — it's our exclusive blue-dyed Canadian asbestos filler.

Check 1274 opposite last page

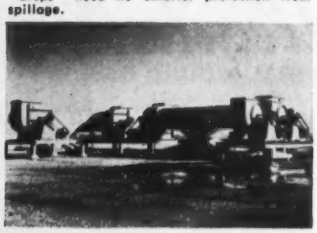
another corrosive fumes ventilating problem

Duracor Ventilation System exhausts 250,000 C.F.M. of corrosive fumes from large electronic equipment plant.



Strong, lightweight DURACOR ducts over 5 feet in diameter require minimum support.

Corrosion-proof throughout, these DURACOR "drops" need no exterior protection from spillage.



Weather and corrosion resistance are provided by DURACOR "T" sections on roof.

PROBLEM: This ventilating system had to withstand sulphuric, nitric, chromic, phosphoric acid and cyanide fumes emitted from the plant's plating and anodizing operation.

SOLUTION: Working from customer specifications, Ceilcote engineers built the entire ventilating system shown here completely from DURACOR.

INSTALLATION: Experienced Ceilcote supervisors and crews handled the complete installation under one contract. Materials and workmanship are fully guaranteed.

WHAT'S YOUR PROBLEM? . . . DURACOR resists any corrosive gas, fume or liquid . . . can be fabricated to virtually any shape. Write today and tell us about your requirements.

DURACOR CEILCOTE 8019-CC

THE CEILCOTE COMPANY, INC.
4834 Ridge Road • Cleveland 9, Ohio

Check 1275 opposite last page

Corrosion economics shows titanium not so expensive

Annual cost may be less than other materials

Titanium equipment is not nearly as high in price as might be indicated by the cost of the metal per pound. This is shown in a cost analysis made by Pfaudler Company on a reactor made of titanium and two other corrosion-resisting metals.

On the basis of per pound price, titanium is 15.5 times as expensive as Metal A. However, when titanium's lower density is considered, price factor is reduced to 8.5. Labor costs in fabrication further level material costs so that finished unit is only three times more expensive made of titanium.

The clincher in this case, however, is that the service life of the reactor was estimated to be five years with titanium and only six months with Metal A. Hence, the cost per service year is only about one-third as much with titanium being used.

In many cases, the really large savings that can be achieved through use of titanium result from elimination of lost production time. For example, at Du Pont every time a thermowell went down, $1500 was lost. Switching to titanium resulted in a large saving.

Another economy obtained by using titanium comes from elimination of contamination. Impairment of product quality could easily result in a large loss. Titanium has been the answer here in a number of cases.

Also, the high yield strength of titanium is a favorable factor in comparisons with other materials. Perhaps a vessel made from titanium need not be as thick as would be necessary with another metal. Hence, costs would be decreased.

Another consideration is that it is likely that the price of titanium will decrease in the future. Dr. H. H. Kellogg, of Columbia University, forecasts a price for titanium of about two dollars per pound with 200,000 tons per year being produced.

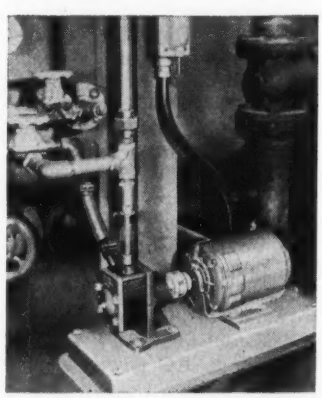
The important fact to keep in mind, however, is that at its present time, titanium can give large savings in applications where it is needed for corrosives encountered. Corrosion evaluation takes time and now is the acceptable hour for companies to evaluate titanium equipment for a variety of uses.

(Condensed from technical paper, "Titanium and Corrosion Economics," which was presented at the 1958 Annual Meeting of the National Association of Corrosion Engineers in San Francisco. Paper was prepared by A. G. Caterson, Rem-Cru Titanium, Inc., Div. of Crucible Steel Co. of America, Midland, Pa.)

Check 1276 opposite last page.

Halt pump contamination excessive maintenance; assure product purity

Elimination of metal pump contamination to protect product purity, and cutting down of excessive pump repair have always been problems faced by the pharmaceutical and cosmetic industries. Both of these problems were vexing Reheis Company, Berkeley Heights, New Jersey.



Sealless plastic pump provides maintenance-free performance in handling abrasive slurries

Reheis Company is one of the largest organizations engaged in the manufacture of

aluminum hydroxide gels, chlorohydroxide, and other related fine chemicals. In one phase of the manufacturing process, fluids that quite often run to 5% solid slurries. (generally abrasive) are recirculated through pH electrode assemblies.

Readings range from 2-11 pH with the operation running 4-5 hours a day, 6 days a week. Recirculation was accomplished by typical rotary pumps which caused constant problems from two sources. First, product purity was being continuously contaminated by construction of the pumps. Second, excessive maintenance was required because of corrosion and leakage of pump shafts scored by abrasive fluid.

Both of these problems were solved when Reheis purchased several plastic sealless pumps. Buna N housing and Buna N flex-i-liner of pump eliminated metallic contamination since the fluid cavity of pump is formed by the inside of the plastic housing and the outside of the synthetic liner. A rotor mounted on an eccentric shaft rotates within the flexible liner creating a progressive squeegee action on the isolated fluid, moving the slurry about the pump.

Since pump design eliminates both stuffing boxes and shaft seals, leakage is no longer a problem. The flexible liner absorbs the abrasive action which formerly caused excessive replacement of rigid metal components. Consequently, the corrosive and abrasive slurry which formerly caused havoc and excessive repair to the metal pumps is now easily handled.

The two sealless plastic pumps have been in service over a year without any maintenance whatsoever. Because of their success, larger capacity units have been installed and are now operating 10-15 hours a day handling abrasive slurries.

(Model XB-N12 plastic sealless pump is product of Vanton Pump & Equipment Corporation, 201 Sweetland Ave., Hillside, N. J.)

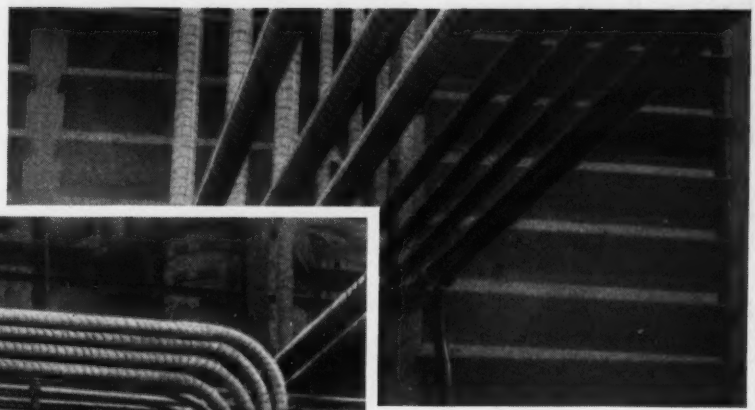
Check 1277 opposite last page.

THE MODERN TOOL... AT WORK FOR MODERN INDUSTRY

to stop corrosion

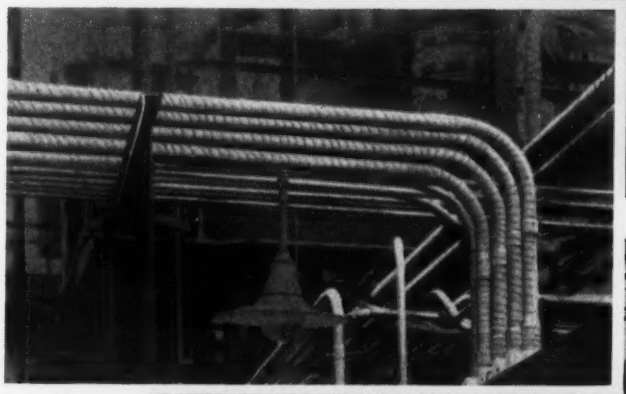
here

Polyken Protective Tape Coating is tough and long-lasting . . . that's why maintenance men prefer it to costly repainting.



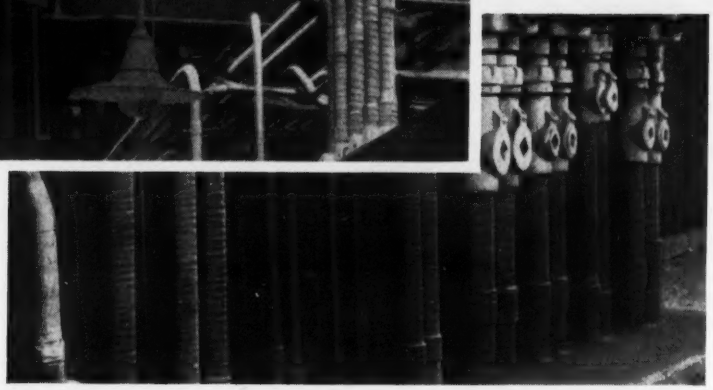
or here

Polyken is polyethylene tape coating . . . elastic, inert, nondrying . . . offering stable protection under severe chemical conditions.



or here

Polyken's doubly thick adhesive system holds tight . . . seals voids . . . bonds to clean surfaces without a primer.



start here

(contact your local Polyken distributor)

Atlanta, Georgia: Steele & Associates, Inc.
Chicago, Ill.: Sales Engineering, Inc.
Cincinnati, Ohio: Hare Equipment
Cleveland, Ohio: The Harco Corp.
Denver, Colo.: Patterson Supply Co.
Des Moines, Ia.: The Donald Corp.
Fort Worth, Texas: Plastic Engineering & Sales Corp.
Gretna, La.: Allen Cathodic Protection Co.
Houston, Texas: Cathodic Protection Service
Kansas City, Mo.: Industrial Coating's Engineering Co.
Long Beach, Calif.: Barnes & Delaney
Minneapolis, Minn.: Simcoe Equipment Co.
Philadelphia, Pa.: Harold N. Davis Co.
Pittsburgh, Pa.: Royston Laboratories, Inc.
Plainfield, New Jersey: Stuart Steel Protection Corp.
St. Louis, Mo.: Shutt Process Equipment Corp.
San Francisco, Calif.: Aetna Sales Co.
Seattle, Wash.: Farwest Corrosion Control Corp.
Seattle, Wash.: Pacific Water Works Supply Co.
Tulsa, Okla.: William Cluff Corp.

Polyken®

Experienced in modern PROTECTIVE COATING

THE KENDALL COMPANY
Polyken Sales Division

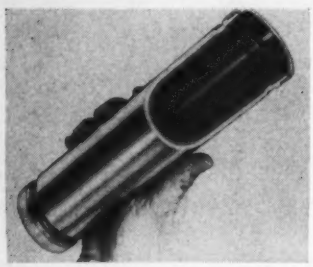
Check 1278 opposite last page

Steel joins plastic in pipe designed to resist corrosion

Rigid PVC lining protects welded steel jacket

Uses: Pipe is designed for use in applications where corrosion is a problem and high pressures must be held.

Features: A rigid polyvinyl chloride tube is jacketed with an electric-resistance welded steel pipe. Result is a product



Pipe combines corrosion resistance of PVC with strength of steel

that combines strength of steel with chemical resistance of plastic.

Description: Working pressures of 1000 psi at 150°F are attained. Pipe ends as well as inside surfaces are protected. Victaulic couplings lock into mill-rolled grooves to give quick make-up and reuse. Pipe is available in 20-ft mill lengths in 2, 3, and 4" nominal OD sizes.

(Jal-Jacket PVC-lined steel pipe is a product of Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.)

Check 1279 opposite last page.

Flow range 20% higher— low-cost installation with PVC fittings

Uses: Designed for applications wherever moderate pressures and temperatures permit use of lighter-weight pipe fittings; such as, low-pressure crude oil and natural gas transmission lines, salt water disposal lines in petroleum fields, and water piping systems where salt, hardness,

Holiday destination-

Saturday problem: Damaged 8,000 gallon reactor

Sunday job: Trouble-shoot and repair

Monday result: Reactor back "on-stream"

It's nine Saturday night. Home phone rings long distance. It's a Texas customer's voice: "One of our 8,000 gallon reactors was damaged. How soon can you fix it?" Answer: "Trouble-shooter leaving earliest flight." Glascote service engineer packs. Takes-off 7 a.m. Sunday. Repairs completed 10:30 that night. Monday — and he's up early. Repairs inspected. Reactor started up and back "on-stream."

Case in point: Every Glascote customer is automatically enrolled in our life-long preventive maintenance and flight-fast service programs!

Our objective: *Protecting profitability of your Glascote glass-lined equipment.* This basic protection program includes process engineering and consulting help, in-plant seminars and specialized field service.

What's behind the Glascote sales engineer . . . and his glass-lined products? He's an experienced engineer who can give you on-the-spot product and process assistance. And behind him—38 years of Glascote experience in manufacturing glass-lined vessels and tanks for the process industries. Through continual research and development engineering, Glascote stays ahead of the demand for new and improved processes requiring a wider range of corrosion, temperature and thermal shock-resisting properties for glass linings.

Custom and Standard Reactors — Designs include the HR (Heavy-duty closed), CR (clamp-top), SR (standard closed) and the new spherical reactor. Capacities range from 300 to 8,000 gallons dependent on design.

Glascote®
PRODUCTS, INC
CLEVELAND 17, OHIO

Sales offices or agents in principal cities. Export sales: A. O. Smith International S. A., Milwaukee 1, Wisconsin, U. S. A.

A SUBSIDIARY OF **A. O. Smith** CORPORATION
World's largest manufacturer of glass-protected steel products

Check 1280 opposite last page

ionization, or other factors pose severe corrosion problems.

Features: Fittings are lightweight, corrosion resistant, and economical to install. Laboratory and field tests show that units provide unimpeded flow that ranges up to 20 percent higher than that expected from conventional pipe.

Description: Solvent-cemented, socket-type, unplasticized polyvinyl chloride fittings are made of both normal and high-impact materials. Fittings come in both Schedule A and Schedule 40 wall thicknesses. They match standard pipe sizes that meet ASA and ASTM standards.

Line includes 90- and 45-degree elbows, tees, couplings, and caps in ¾ to 2″ sizes, as well as 3 and 4″ couplings.

(PVC pipe fittings are available from Tube Turns Plastics, Inc., Div. of Chemetron Corp., 224 E. Broadway, Louisville 1, Kentucky.)

Check 1281 opposite last page.

Steel surfaces sealed and passivated by coating

Compound works on non-ferrous metals also

Uses: A passivating anti-corrosion treatment and primer for steel and non-ferrous metals.

Features: Compound forms complex metallic phosphate coating that completely passivates the surface and renders it invulnerable to moisture, non-conductive, and non-electrolytic. Hence, corrosion process cannot get started.

Description: Phosphating compound is non-flammable, non-toxic, and can be applied by brush, spray, or dipping. Coverage is 300 to 400 sq ft/gal. Material cost is about 2c/sq ft.

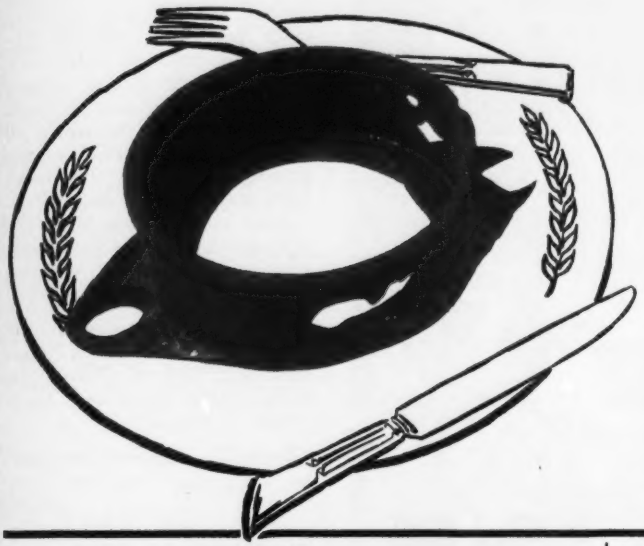
(Atlantic grayguard metal conditioner and primer is a product of Atlantic Laboratories of Delaware, Inc., Wilmington 99, Del.)

Check 1282 opposite last page.

ENGINEERING

NEWS YOU CAN USE ABOUT ENGINE AND COMPRESSOR PERFORMANCE

BIG MEAL FOR CORROSION!



INSIST ON CORROSION-RESISTANT COOK PACKING GLANDS

Even in the very toughest service, there's no excuse for rust and corrosion eating away your packing glands. In 999 cases out of 1000, packing glands of Cook stainless steel or *Ni-Resist* type iron will solve the problem. For the remaining 1 problem in 1000, Cook can probably design an answer. That's because C. Lee Cook pioneered in the field of metallic packings — knows more about their specific, on-the-job use than anyone else. Insist on genuine C. Lee Cook parts and service.

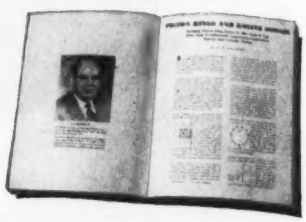
COOK RINGS IN DIESEL SERVICE 3 YEARS—STILL GOING STRONG

Here's a report on Cook rings at Rockville Centre, N. Y. municipal power plant. It's the result of a cylinder inspection on their No. 8 diesel unit after nearly three years of continuous operation.

"While several rings were replaced in Grooves 1 and 2, Cook rings in Grooves 3, 4, 5 and 6 could run for another 10,000 hours! And cylinders averaged less than .001" maximum wear per 1000 hours of operation."

"Piston Rings and Engine Power"

SEND FOR FREE 8-PAGE BOOKLET!



Write for your free copy of this technical article on the importance of keeping piston ring faces to the wall . . . an informative study of the effects of piston ring problems on the various types of engines and their operation. Write C. Lee Cook Company, 932 South 8th Street, Louisville 3, Kentucky.

C. LEE COOK COMPANY

Division of Dover Corporation

Rings and Packings Since 1888

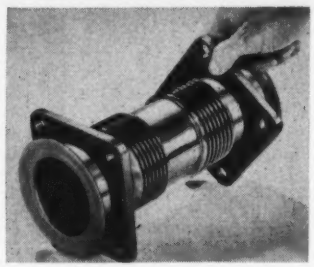
Check 1283 opposite last page

CORROSION CONTROL

Offer stainless bellows for lines handling corrosives

Uses: Providing for expansion and contraction in lines handling corrosives at varying temperatures and pressures.

Features: Bellows, fabricated from stainless steel, have tandem corrugations for maximum flexibility.



Stainless bellows are available in diameters from one to six inches

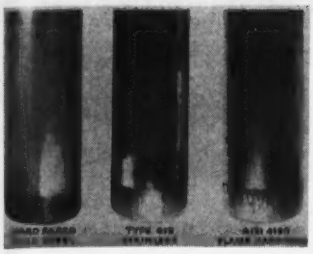
Description: Units are available with fixed or floating flanges or straight necks in diameters from one to six inches.

(Stainless steel bellows are a product of U.S. Flexible Tubing Company, Bartlett, Ill.)

Check 1281 opposite last page.

"Durned if I ain't gonna send off fur some technical literachoor and find out how other shinemakers whup corrosion."

Thanks to Tom Blakley, Florida East Coast Fertilizer Co., Homestead, Florida.



Resist salt water

Three 3″-diameter pump plungers were subjected to corrosive oxygenated synthetic brine containing 65,000 ppm of NaCl, 3000 ppm $CaCl_2$, and 1000 ppm $MgCl_2$. Temperature was 120°F, and pump operated at 750 psi. Center plunger, made of hardened 410 stainless steel with Rockwell C-scale hardness of 48, remained in service 13 days before scores and cracks developed to dictate replacement.

Plunger on right, flame-hardened AISI 4150 steel with hardness of 60 Rc, lasted two days. Plunger on left, a mild-steel part protected with Colmonoy No. 6 hard-facing alloy, lasted 76 days in operation.

No. 6 alloy is nickel-base material containing chrome borides. It is applied in powder form by means of special process.

(Colmonoy No. 6 alloy is product of Wall Colmonoy Corporation, 19345 John R St., Detroit 2, Mich.)

Check 1285 opposite last page.

Complete line of fittings for titanium pipe being offered

Manufacturer is offering complete line of welding fittings and flanges of commercially pure grades of titanium to match every schedule and size of titanium pipe now made. According to manufacturer, most pipe now using this metal is in sizes from ½ to 3″, but there have been instances of commercial applications as large as 20″ in diameter. By offering a full selection of fittings and flanges to make possible any type of welded pipe system, manufacturer believes that it is facilitating the use of titanium for peacetime industry.

Titanium weighs only 56% as much as stainless steel; has a high strength-to-weight ratio at temperatures as high as 850°F. It gives extreme resistance to corrosion by nitric acid, wet chlorine gas, solutions of chlorine, chlorinated organic compounds, and inorganic chloride solutions. Metal is also immune to the corrosive effect of salt water and marine atmosphere.

(Fittings are available from Tube Turns, div. of Chemetron Corp., 224 East Broadway, Louisville 1, Ky.)

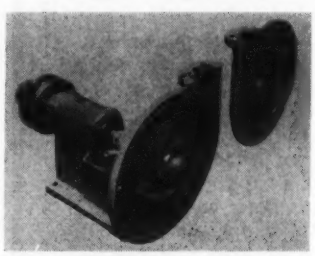
Check 1286 opposite last page.

Synthetic rubber lining excels in resistance to pump corrosion

Uses: For handling corrosive liquids.

Features: Hypalon (chlorosulphonated polyethylene) synthetic rubber lining provides greater resistance to abrasion and corrosion than conventional lining.

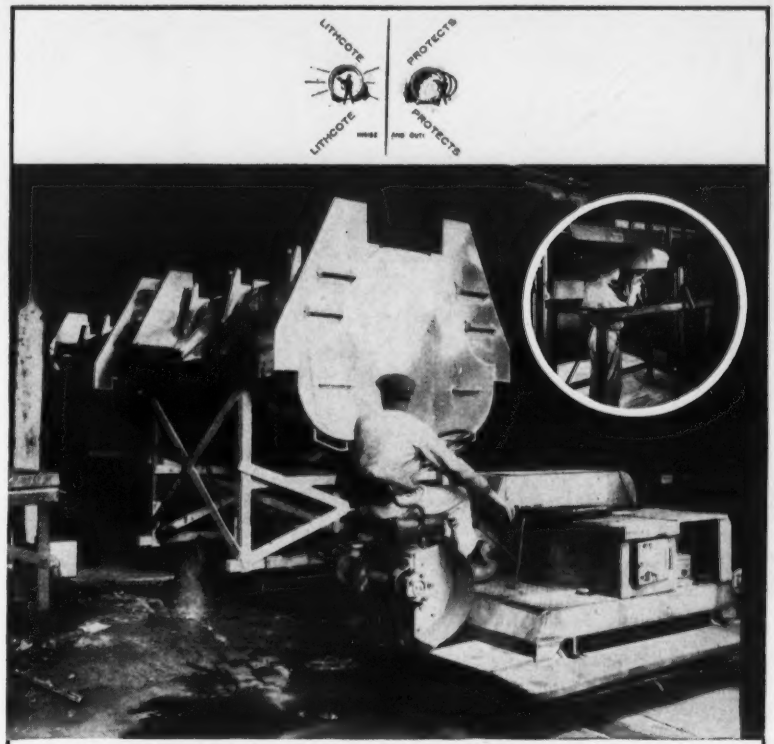
Description: Lined centrifugal pump is available in 1¼, 2, and 4″ sizes. Pneumatically operated diaphragm pump requires no mechanical linkage; is available in 1½, 2, 3, and 4″ sizes. In both pumps, all parts in contact with corrosive solutions are Hypalon lined or covered.



Hypalon lining in slurry pumps provides greater resistance to both abrasion and corrosion

(Diaphragm slurry pumps are available from Dorr-Oliver Inc., Stamford, Conn.)

Check 1287 opposite last page.

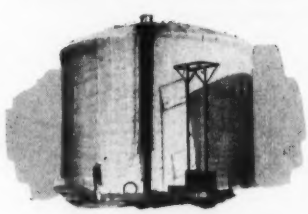


HERE'S HOW LITHCOTE PUTS PERMANENT PROTECTION ON DIFFICULT SHAPES AND SIZES...

This is one of several special aluminum trailer tanks—being dollied into a Lithcote oven for a spray coating of NEOPRENE. It's the kind of job that requires the best in application facilities and experience.

NEOPRENE, of course, is only one of the materials Lithcote applies to all shapes and sizes of metals. AMERCOAT, BISONITE, COLUMBIA #7, COPON, PLASITE, UNICHROME, KEL-F, as well as the famous LITHCOTE line of products are also available.

Point is, Lithcote is best qualified to handle any or all of your corrosion and contamination problems, and can do it faster with resultant savings to you!



FIELD APPLICATION

Lithcote Crews are regularly on the job to help cut the high cost of field applications. Work can usually be completed without interfering with regular plant routine.

ASK FOR CATALOG

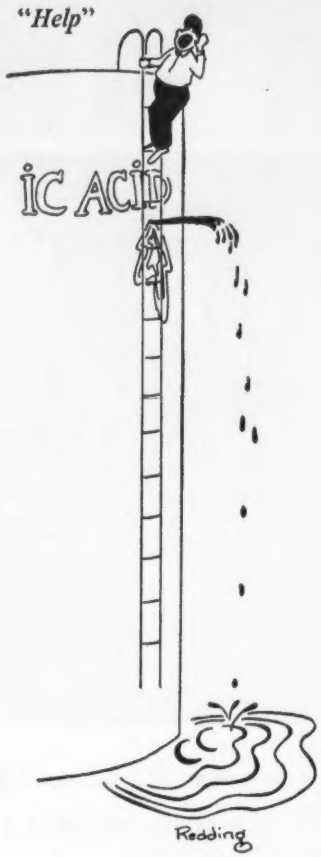
For more than a "product" bulletin. Lists actual applications in industry of all kinds. Gives complete data on famous Lithcote line.

LITHCOTE CORPORATION

5000 W. Lake St., Melrose Park, Ill. • 42 Belden Ave., Norwalk, Conn.
36 W. 44th St., New York 36, N. Y.

Check 1288 opposite last page

Life in these excited states...



Ever "Treed" by Corrosion?

Ever left high and dry by corrosion . . . sweating out repairs, shut-downs, wasted materials? You can solve 85 to 100% of these problems once and for all with Ace chemical resistant piping, valves, pumps, tanks and other equipment. It doesn't *cost* . . . it *pays*.

Best non-metallic pipe anywhere for *hot* chemicals to 275°F. Also handles tough organics. Rigid, tough nitrile. Pipe and fittings to 8". *Bul. 96A.*

1001 uses. Non-toxic, odorless, tasteless, sterilizable, flexible tubing. Excellent for chemicals, foods, and for lab or machine lines. ⅛ to 1¼". *Bul. 66.*

Heavy Ace rubber and plastic tank linings unexcelled for alkalies, acids, bleaches, salts. Faultless seams, indestructible bond, shock and age-resistant. All shapes. *Bul. CE-53.*

Special equipment often can be machined, punched or welded of standard plastic or hard rubber sheet, rod or tubing. Write for details today.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

Check 1289 opposite last page

CORROSION CONTROL

Polyethylene tape protects 122-mile pipeline

An example of the increased use of polyethylene tape on underground pipelines is the recently installed 122-mile pipeline extending from Defiance, Ohio to Bridgman, Michigan. Wrapping this 22"-diameter pipeline with the tape is expected to ward off corrosion for many years.

In manufacturing the tape, polyethylene resin is first converted to calendered film. This, in turn, emerges as the pressure-sensitive, adhesive tape of uniform thickness.

With a wrapping machine, tape is quickly applied

Tape is an excellent electrical insulator with a resistivity of more than 100,000 megohms per mil. Moisture-absorption capacity is under 0.02% by weight and a nearly non-existent water vapor transmission rate marks polyethylene as the ultimate moisture barrier. These properties, plus its physical stability and chemical inertness, make the tape an effective shield against corrosion.

It has been found that the tape can be applied with 50% less labor than conventional method for protecting underground lines. Pipeline can be wrapped with tape at rate of about two miles per day.

(Polyethylene resin used in tape is product of Bakelite Co., div. of Union Carbide Corp., 655 Madison Ave., New York 21, N.Y.)

Check 1290 opposite last page.

(Polyethylene tape is product of Polyken Sales Div., The Kendall Co., 222 West Adams St., Chicago 6, Ill.)

Check 1291 opposite last page.

NOW
TUNGSTEN CARBIDE HARD FACING
with the METCO ThermoSpray Gun

Now you can apply coatings of this extremely hard material with the required concentration of carbide, to any desired thickness, with a low-cost installation in your own plant, or have it done at reasonable cost in a metallizing job shop.

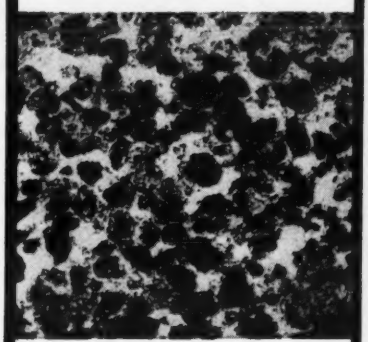


Photo-micrograph of sprayed coating, showing high tungsten carbide (dark particles) concentration. Mag. 50x – actual size of area shown, approx. .040" x .040". (Photo courtesy Sam Tour & Co., Inc.)

These coatings are non-porous, homogeneous, have very high tensile strength and provide excellent wear resistance under the most extreme service conditions.

For full details—write, wire or phone for Bulletin 139. No obligation, of course.

METCO

Metallizing Engineering Co., Inc.
1189 Prospect Ave., Westbury, Long Island, New York EDgewood 4-1300
In Great Britain: Metallizing Equipment Co., Ltd., Chobham near Woking, England

Check 1292 opposite last page

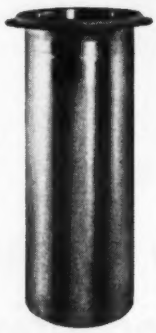
PUT A-P-C'S
SIXTH SENSE
in Stainless Steel Craftication* to Work for You!

High Versatility!

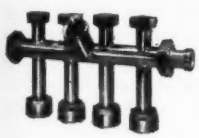
ONE PIECE
OR A MILLION

Many customers have used the term "a SIXTH SENSE" in describing A-P-C's unusual talent in stainless steel . . . And A-P-C has such a wide range of equipment — such great versatility in production *that one piece or a million are welcomed.*

Typical deep draw from one piece



Complicated tubular fabrication



High production runs for parts

Deep, unbelievably deep and complex draws . . . unusual, A-P-C designed automatic heliarc welding machines . . . extensive machining facilities . . . and 29 years of experience in a wide range of products and components are ready to go to work for you.

Craftication is our term for fabrication by A-P-C's skilled craftsmen

ALLOY PRODUCTS CORP.
1075 Perkins Avenue
Waukesha, Wisconsin

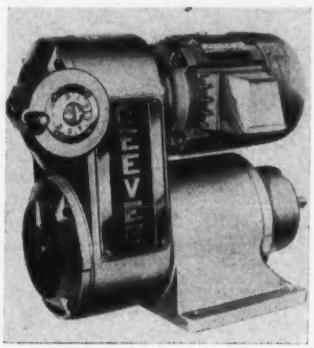
Check 1293 opposite last page

Variable-speed drive performs dependably despite corrosives

Entire case of cast iron; internal parts protected

Uses: For service where corrosion presents an operating problem.

Features: Entire case of unit, manufactured of cast iron, is impervious to most corrosive conditions. Effective sealing of case openings exclude corrosion-causing materials from all internal operating parts.



Corrosion-resistant construction of variable-speed drive permits it to withstand rugged service

Description: Variable-speed drive has lubricating system which eliminates possibility of sticking discs in corrosive atmospheres. System distributes lubricant into fine grooves in hub bore of sliding disc, and thoroughly coats the entire sliding contact surface. There is no metal-to-metal contact.

(Motodrive is product of Reeves Pulley Company, Div. of Reliance Electric & Engineering Co., Columbus, Ind.)

Check 1294 opposite last page.

Vinyl primer data

Information on quick-drying, rust-inhibitor vinyl primer is contained in four-page bulletin. Test data illustrate primer's ability to perform effectively over damp, wire-brushed rusty steel surfaces. Bul 018 — Prufcoat Laboratories, Inc., 63 Main St., Cambridge 42, Mass.

Check 1295 opposite last page.

. . . through hoppers, chutes, feeders, mixers, packaging machines, etc. TEFLON*—the slipperiest, static-free, solid material known—keeps difficult powders and other dry materials flowing freely.

Eliminates need for vibrators or manual attention usually required to keep powders moving. This unique lining material is also corrosion and contamination proof.

Prevents delays . . . assists in automation of mixing, blending, weighing, packaging, tabletting and other operations.

Cementable TEFLON easily applied. Cementable TEFLON, Garlock No. 8536, with one side treated for application to metal, wood, glass, concrete, or other surface with standard commercial adhesives, is now available in economical thin-section (.005" to .060") continuous tapes up to 12" wide, and in 1/16" and thicker sheets up to 48" x 48" in size.

*du Pont Trademark

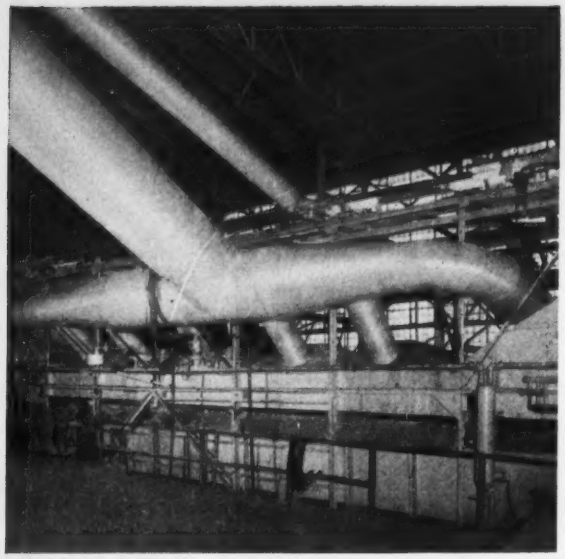
For prompt service, contact one of The Garlock Packing Company's 30 sales offices and warehouses throughout the U.S. and Canada or write for Bulletin AD-158.

United States Gasket

United States Gasket Company
Camden 1, New Jersey

Plastics Division of GARLOCK

Check 1296 opposite last page



AVAILABLE:

STANDARD* PLASTIC CORROSION PROOF COMPONENTS FOR ACID *FUME* REMOVAL!

You can easily install corrosive fume removal systems; using lightweight, easy-to-handle, standardized components of RIGIDON (fiber glass reinforced) and RIGIVIN (Vinyl P.V.C.) developed by Heil corrosion proof equipment experts. These standard components include: Hoods, Ducts, Stacks, Fittings, Tank Covers, Flat Sheets, and Cementing Kits. And HEIL will help you — write describing your fume problem, for recommendation of the type and size of plastic duct system to use.

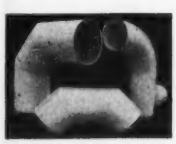
Ask us to send standard parts catalog sheets.

HEILASTIC LININGS — Rubber, Koroseal, Plastic.

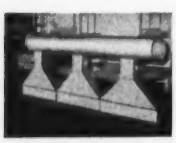
METAL FABRICATION — Steel Plate, Sheet Metal, Lead, Alloys.

HEIL also produces: Tanks, Heaters, Heat Exchangers, Exhaust Systems, Lined and Solid Plastic Fans, Fume Scrubbers, Packed Towers.

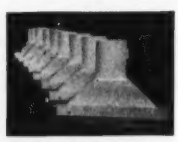
*HEIL will also "custom-fabricate" a special fume removal system to your specifications, regardless of size.



Light, strong elbows and fittings.



Units are easily assembled, using standard cementing kit.



Hoods furnished complete in standard sizes.

One source — One responsibility

CHEMICAL PROOF LININGS · TANKS HEATERS PLASTICS

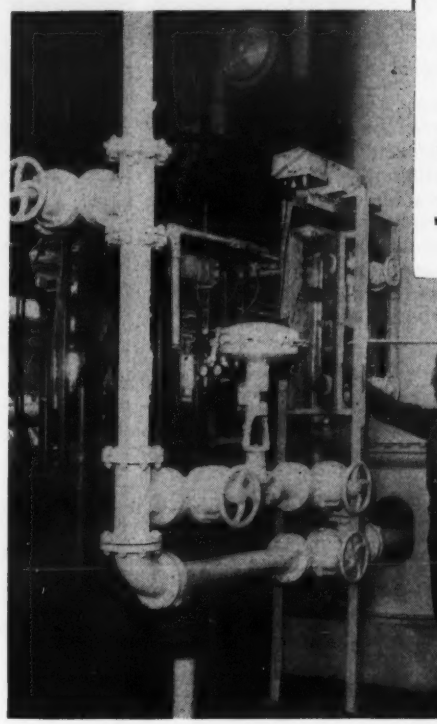
HEIL PROCESS EQUIPMENT

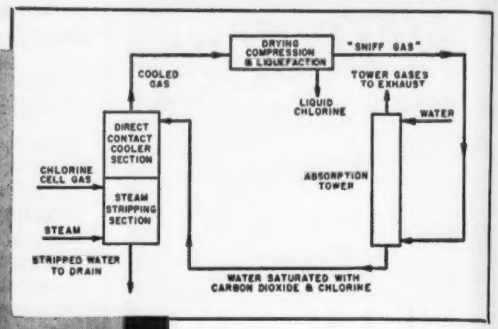
CORPORATION

12901 Elmwood Ave. • Cleveland 11, Ohio

Check 1297 opposite last page

cp PROCESSING EQUIPMENT





▲ Water entering absorber performs double duty. After absorbing chlorine and carbon dioxide it flows to contact cooler where it cools incoming chlorine cell gas

◀ Sniff gas enters bottom of 33'-high absorption tower where chlorine and carbon dioxide are absorbed by water

Chlorine recovery system

• *pays out in a year*
• *avoids air pollution*

Efficient process recovers over 99.9% chlorine from "sniff gas" at Hooker Chemical Corp.

TED F. MEINHOLD, Associate Editor
with **JOSEPH A. TARDIFF,** Works Manager
Montague Plant, Hooker Chemical Corporation

Economic recovery of chlorine from "sniff gas" (vented mixture of air, oxygen, carbon dioxide, carbon monoxide, hydrogen, and chlorine) is being achieved through use of an efficient recovery system at Hooker Chemical Corporation's Montague, Michigan, chlorine plant. Savings due to recovered chlorine have been so great that capital cost of equipment was written off in less than one year. Chlorine recovered from the sniff gas ranges from 2 to 7% of total chlorine produced at the plant.

Patented by the company and available to interested parties on a license basis, process permits recovery of large quantities of chlorine that would otherwise be lost or tied up in some by-product. Of equal importance, system provides safeguard against air pollution. Sniff gas normally must be neutralized or in special cases vented if there is no immediate use at the plant for it. The gas can cause a serious fume nuisance and disposal

problem, especially in communities where strict pollution laws are in force.

Packed Absorption Tower Key Unit

Hooker's method of recovery involves use of a packed absorption tower in which the sniff gas from chlorine drying, compression, and liquefaction system is fed into bottom and fresh water is fed into top. Chlorine and carbon dioxide are absorbed by the water. Chlorine absorption is over 99.9%. Some fresh air is bled into the sniff gas before it enters tower. This minimizes explosion hazard by diluting hydrogen concentration accumulating in tower and assists in the control of CO_2 absorption.

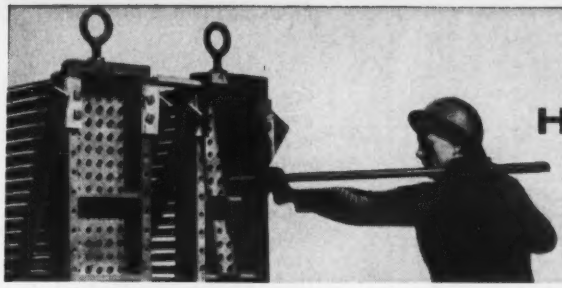
Absorption tower at Montague is 3½′ diam x 33′ tall. Unit is constructed of steel and is lined with hard rubber. Entire internal volume is filled with beryl saddles. Packing support plates are made of porcelain. Absorber was designed for water rate of 56,000 to 94,000 lb per hr and sniff gas rate of 290 to 900 lb per hr. Unit operates under liquefaction pressure which is about three atmospheres.

Water Performs Double Duty

Effluent water leaving bottom of absorber is fed into top of a direct-contact cooler (see drawing) where it is used to cool chlorine cell gas coming from electrolytic cells. Water is thus doing double duty — absorbing chlorine and carbon dioxide from the sniff gas and cooling the hot cell gas. Cooler operates under atmospheric pressure.

Water from cooler is fed directly into the steam stripper section operating at 99°C+, which is also packed. Most of chlorine is stripped out of the water and enters the regular cell gas stream. Additives are used in the stripper stage to reduce chlorine concentration of effluent water to less than 50 ppm. Water can be safely dumped into plant sewer system.

To prevent chlorine recov-

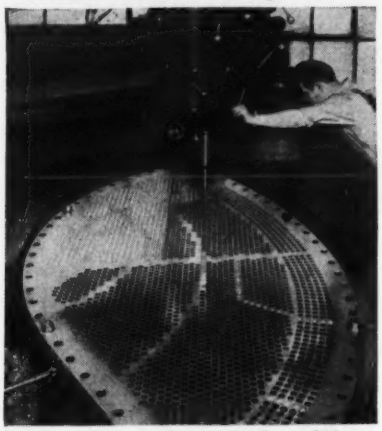


CONDENSER AND HEAT EXCHANGER CLINIC

Edited by Arthur W. Tracy, Metallurgical Engineer
The American Brass Company, Waterbury, Conn.

Selecting alloys for rolled tube sheets and baffles

Tube sheets and baffles are available from The American Brass Company in a wide variety of shapes, sizes and alloys to meet the problems of corrosion, pressure, and temperature encountered in condensers and heat exchangers.



Reaming a large condenser tube sheet of Naval Brass-450.

The following Anaconda alloys are those most widely used for tube sheets and baffle plates.

Leaded Muntz Metal-274 has good strength, stiffness and elasticity. It machines well and is the most commonly used tube-sheet metal. Leaded Muntz Metal hot rolls easily and can be manufactured in very large sizes. Many of the other tube-sheet alloys are superior to Leaded Muntz Metal in corrosion resistance and are used in preference to it for that reason. However, tube sheets are necessarily so thick that a long time elapses before they are affected by corrosion to the extent that their strength or usefulness is impaired.

Naval Brass-450 is an alloy of the same general type as Leaded Muntz Metal but includes approximately 0.75% tin in its composition. The tin content increases the alloy's resistance to corrosion, and makes it preferable to Leaded Muntz Metal, especially at higher-than-normal working temperatures. Hot-working properties of Naval Brass are similar to those of Leaded Muntz Metal.

Arsenical Admiralty-439 is resistant to dezincification corrosion and can be used where its higher resistance to corrosion is required, especially in process equipment.

Ambraloy-917 is available for use where strength and corrosion resistance superior to Naval Brass and Admiralty Metal are desired, as in oil-cooler tube sheets.

Cupro Nickel, 10%-755 and Cupro Nickel, 30%-702 are used extensively with tubes of similar composition in marine condensers and process heat exchangers.

Baffle and Support Plates for use in oil-refinery equipment are most often of Leaded Muntz Metal and Yellow Brass. For more severe applications, Admiralty, Naval Brass, Cupro Nickel, Copper and Everdur® are often employed.

Rolled Plates Superior. Anaconda sheets, plates, and circles are produced by the rolling process. They are commercially flat, accurate in dimensions, and free from the surface imperfections and porosity often prevalent in cast plates.

Standard Sizes. The American Brass Company makes plates for condenser tube sheets of copper and a number of copper alloys in rectangular sizes up to 156 inches in width and weights up to 15,000 pounds for any shape that can be cut from such sheet. The maximum standard limits for circles are 160 inches in diameter and 11,000 pounds in weight. Half circles can be produced up to 13,000 pounds in weight.

Rolled circles of Ambraloy-917, 2" thick, for water-to-water heat exchanger tube sheets requiring superior strength and corrosion resistance. Such circles can be furnished up to 5" thick, offer savings in material cost over comparable circles produced by the forging process.

Special jobs. When specifications call for extremely large plates or special alloys for special applications, The American Brass Company will gladly cooperate in the solution of such problems. For further information on Anaconda Condenser Tubes or Tube Sheets write: The American Brass Company, Waterbury 20, Conn. 5875

Nominal compositions of Anaconda condenser tube sheet and plate stock

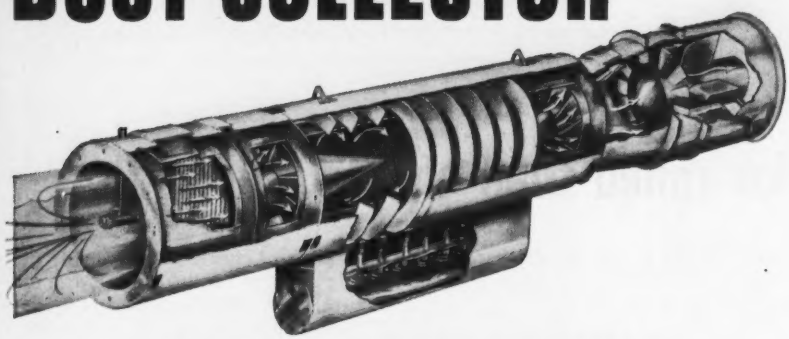
Alloy	Copper %	Zinc %	Tin %	Nickel %	Aluminum %	Lead %	Manganese %	Phosphorus %	Silicon %	Iron %	Arsenic %
Leaded Muntz Metal-274	60.0	39.40	—	—	—	0.60	—	—	—	—	—
Naval Brass-450	60.0	39.25	0.75	—	—	—	—	—	—	—	—
Arsenical Admiralty-439	71.0	27.96	1.0	—	—	—	—	—	—	—	0.04
Ambraloy-917 (Aluminum Bronze)	82.0	—	—	5.0	9.50	—	1.0	—	—	2.50	—
Cupro Nickel, 30%-702	68.9	—	—	30.0	—	—	0.60	—	—	0.50	—
Cupro Nickel, 10%-755	88.35	—	—	10.0	—	—	0.40	—	—	1.25	—
Phosphorized Copper-103	99.90+	—	—	—	—	—	—	0.02	—	—	—
Everdur®-1010	95.80	—	—	—	—	—	1.10	—	3.10	—	—

®T.M. Reg. U. S. Pat. Off.

ANACONDA®
Tubes and Plates for
Condensers and Heat Exchangers
Made by
The American Brass Company

Check 1298 opposite last page

NEW PROVED JOY-MICRODYNE DUST COLLECTOR

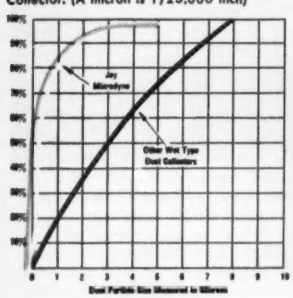


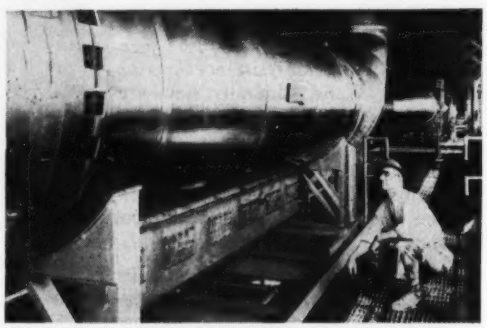
PROFILE OF A PROBLEM SOLVER

Here is an in-duct "educated pipe" that laughs at space, weight and water limitations as it collects over 99% of dust 5 microns and larger; 92% of 2-micron dust, and substantial amounts of smaller dust.

Particles enter through water-saturated air, slam against a water-film-covered impingement element, encase themselves in water droplets as they pass through, then whirl and collect on the sides of the middle section, to finally drain into a sump. Cleaned air is straightened and thrust on its way by an integral Joy Axivane Fan.

Performance graph of actual installation shows efficiency of the Joy Microdyne Dust Collector. (A micron is 1/25,000 inch)





This 48,000 cfm installation shows space economy of in-duct placement.

SAVES SPACE—Installs as an integral section of duct-work; requires only 1/10 to 1/20 the space of conventional units. 2500 cfm unit is 10 feet long; just 15 inches in diameter.

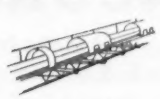
SAVES WEIGHT—Even the largest unit 64,000 cfm, 5 feet in diameter, 32 feet long—weighs only 6,500 pounds . . . or 1/5 the weight of conventional collectors. 2,500 cfm unit weighs only 325 pounds.

SAVES WATER—The largest Joy collector requires only 48 GPM flow—much less than comparable wet collectors. Add a Delpark Filter (Sold by Joy) and water can be recirculated to recover valuable dusts. The filter also reduces water borne solids to give a dependable, clear water supply from a dirty water source.

SUCCESSFUL INSTALLATIONS—Joy collectors from 500 cfm through 64,000 cfm are *now in use* collecting such widely varied dusts as hemitite, copper and uranium ores, coal, quartz, limestone, phosphate, stainless steel and titanium carbide grindings. For answer to your dust collecting problems, write, wire or call: ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

WRITE FOR FREE BULLETIN 227-80

JOY . . . EQUIPMENT FOR INDUSTRIAL PLANTS . . . FOR ALL INDUSTRY



Conveyors | Industrial Compressors | Electrical Connectors | Fans and Blowers

WSW 1-6983-227

Check 1299 opposite last page

ery system from becoming overloaded with recycled carbon dioxide, water volume entering absorption tower is carefully controlled.

Commerically proven at its Montague plant, Hooker has also installed the system at their Tacoma, Washington, and North Vancouver, B.C. (Hooker Chemicals Limited) installations.

(Further information about chlorine recovery system may be obtained from Hooker Chemical Corporation, 1940 Ward Street, Niagara Falls, New York.)

Check 1300 opposite last page.

(Rubber-lined absorption tower was designed by Hooker Chemical Corporation and fabricated by American Hard Rubber Company, Division of Amerace Corporation, Ace Road, Butler, New Jersey.)

Check 1301 opposite last page.

Entrainment separator has no moving parts, is installed easily

Unit is guaranteed to remove 99.5% entrainment

Uses: For removing solid or liquid entrainment from gas or vapor.

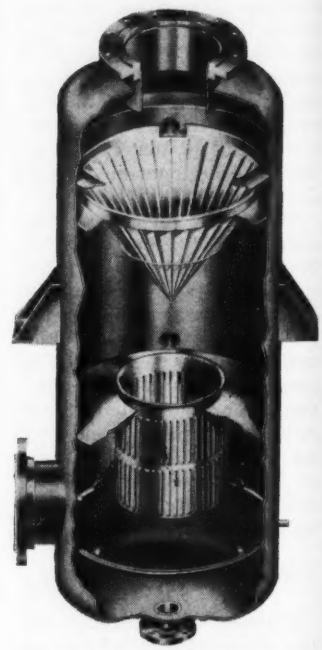
Features: Low-cost, easy-to-install unit is guaranteed to remove 99.5% solid or liquid entrainment regardless of size (1 micron or smaller), density, or chemical characteristics. It is designed for any operating pressure, flow rate, or temperature.

Since it has no moving parts, separator is self-cleaning and non-clogging. It does the purifying job entirely by centrifugal action upon the moving gas or vapor with a minimum pressure drop.

Description: In operation, contaminated gas or vapor enters separator at bottom and spreads out in lower chamber. Here, it is combined with the scrubbing liquid which is either sprayed on outside of the tuyere or fed into base of its inner circumference.

Jet action from its passage through the tuyere blades imparts a rotary motion to the gas. This thoroughly mixes it with the scrubbing liquid and tends to throw the heavier liquid particles to the outside of the rotating mass.

Liquid portion, including contaminants, is discharged over lip of scrubbing tuyere into an annular raceway, and out the scrubbing stage drain. Gas or vapor leaving scrubbing tuyere passes upward into a series of tangential slots in upper tuyere.



Separator has no moving parts, is self-cleaning, non-clogging

Here, a similar rotating motion is imparted which throws off any contaminants carried over from scrubbing tuyere. These contaminants enter a second raceway and discharge through the drying stage drain, leaving only clean gas or vapor to move through top outlet of the vessel.

(WD Scrubber is available from the Centrifix Corporation, 3608 Payne Ave., Cleveland 14, Ohio.)

Check 1302 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Tougher glass used on glass-lined equipment

Glass with 30% greater resistance to thermal shock and 20% more resistance to abrasion, is being used to make glass-lined processing equipment. At normal vessel temperature of 250°F, maximum allowable thermal difference has now been boosted to 260°F, instead of 200°F for previous glassed-steel equipment produced by manufacturer.

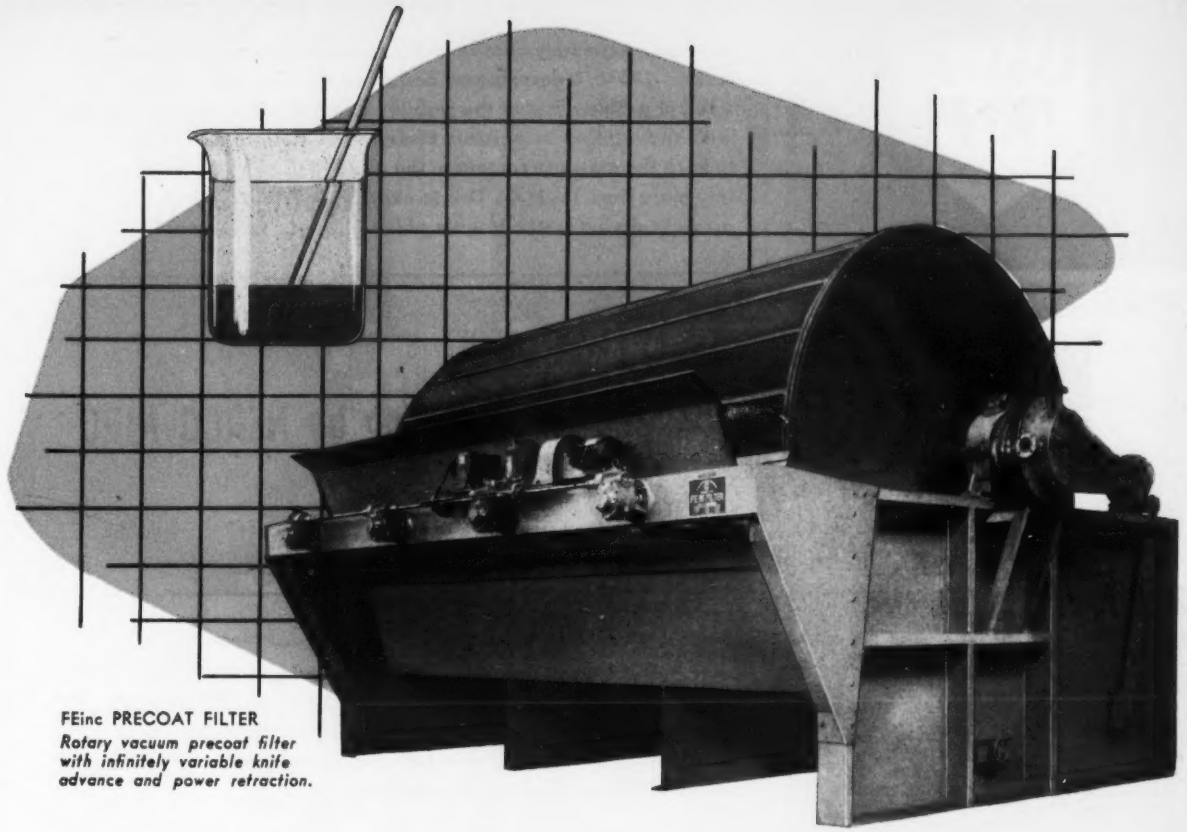
In the lab, test samples of the new product have been repeatedly heated to 450°F and then quenched with water at temperatures just above freezing. No thermal damage occurred.

Material resists all acids except hydrofluoric. It can be used with acids up to 325°F and under some conditions, as high as 450°F without excessive corrosion. Resistance to alkalis is about twice that of hard glass laboratory ware.

(Further information about processing equipment made with Glasteel 59 may be obtained from The Pfaudler Co., a division of Pfaudler Permutit Inc., Rochester 3, New York.)

Check 1303 opposite last page.

"Chief, a guy out here swears that you sent for him to demonstrate a waste disposal unit."



FEinc PRECOAT FILTER
Rotary vacuum precoat filter with infinitely variable knife advance and power retraction.

Custom Filter Design

BEGINS WITH YOUR FILTRATION PROBLEM

Your processing requirements are king at FEinc. They dictate the type of filter to be built, its size, the materials used, and the special refinements necessary to assure highest possible operating efficiency.

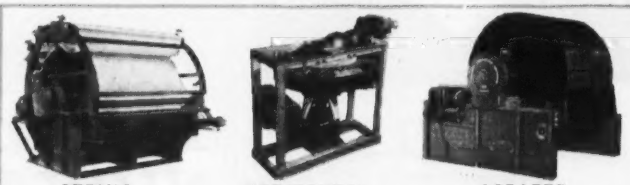
For example, a FEinc Precoat Filter designed to meet your particular needs pays off fast in trouble-free operation, dryer cake discharge and high clarity of effluent.

If you require higher output in limited floor area and a long filtration cycle coupled with the above advantages, FEinc *custom design* can give it to you.

Send us your filtration problems. Specific recommendations provided without obligation.

See our insert in Chemical Engineering Catalog

For a Bigger Yield **FE INC®**



STRING HORIZONTAL SCRAPER

FILTRATION ENGINEERS
AMERICAN MACHINE AND METALS, INC.
EAST MOLINE, ILLINOIS

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

Check 1304 opposite last page

PROBLEM

Drying an extremely heat-sensitive herbicide. If the dried product reaches 235°F. it decomposes and develops flammable gases. Another problem is that the stability of the dried herbicide decreases with any increase in moisture content. It is therefore necessary to keep the moisture content in the dried product very low (not more than 1% H_2O). Due to excessive decomposition, previous drying methods were able to give only 60% yield.

METHOD

"GENTLE-IZED" Spray Drying by NERCO-NIRO

TEST

An extensive series of tests to determine optimum operating conditions and special design details were carried out in the NERCO-NIRO Research Laboratories at Netcong, N. J. Later, 2,000,000 lbs. of herbicide were custom-dried for market research and preliminary commercial supplies.

PROOF

Two years of trouble-free operation in our client's plant has proved the efficiency of NERCO-NIRO "Gentle-ized" Spray Drying. 2,000 lbs. of herbicide powder are produced per hour, at 99% yield, in a NERCO-NIRO Spray Dryer.

APPLICATION

Herbicides, fungicides and fine chemicals that are difficult to handle can be processed for maximum yield, product quality and economy—the NERCO-NIRO way.

Consult our Spray Dryer Engineers on your processing problems

Nerco-Niro Spray Dryer Div'n.

NICHOLS Engineering & Research Corp.
70 Pine St., New York 5, N.Y.

Branch Offices: SAN FRANCISCO • INDIANAPOLIS • MONTREAL

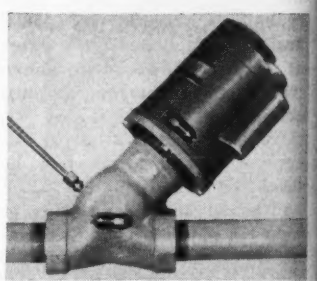
Check 1305 opposite last page

Up to 30 gpm mixed by small, low-cost pipeline mixer

Uses: Mixing liquids, gases, or slurries.

Features: Mixer simplifies and speeds mixing by performing operation directly in pipeline, without need for separate mixing tank.

Description: Unit is designed for low-volume, continuous mixing operations. Mixer is small, low-cost and can be easily installed in any position in pipeline. Unit is suitable for production applications up to 30 gpm. Efficiently designed mixing chamber and impeller assures instant, uniform, and continuous mixing. Units are available in iron or 316 stainless steel.



Mixer can be easily installed in any position in pipeline

(Model "S" Homomix is product of The American Well Works, Aurora, Illinois.)

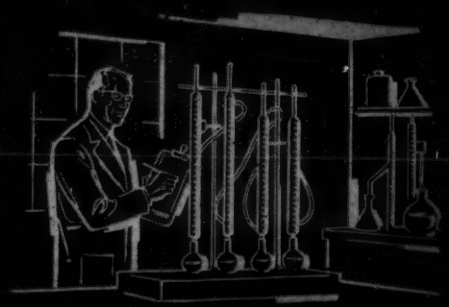
Check 1306 opposite last page.

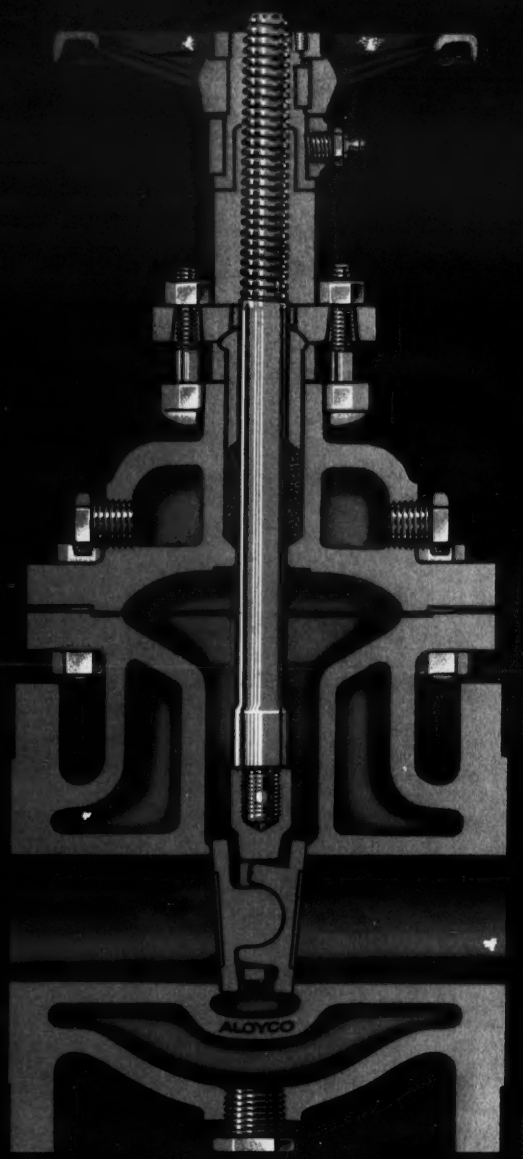
Welded products

Catalog of 36 pages illustrates and describes fabricating facilities for welded products including welded pipe, annealing covers, pressure vessels, galvanizing kettles, and custom plate work. Fabricating facilities cat — National Annealing Box Co., Washington, Pennsylvania.

Check 1307 opposite last page.

For more information on product at right, specify 1308 see information request blank opposite last page.





Thirty years' research devoted exclusively to...

STAINLESS STEEL VALVES

Aloyco's specialized research . . . in the field and in the lab . . . brings you a wealth of metallurgical information for successfully solving your corrosives handling problems.

Coupled with continuing research in design, foundry and machining techniques, this Aloyco specialization results in new and better corrosion resistant valves for many specific applications. One example above: Aloyco completely jacketed valves (the first ever to be integrally cast in high alloys) are designed for viscous liquids and other fluids difficult to move at room temperatures.

Isn't your surest source of supply the one company with research, manufacturing and sales all devoted to Stainless Steel Valves exclusively?

ALLOY STEEL PRODUCTS COMPANY

Linden, New Jersey

PHOTOGRAPHED UNDERWATER AT FLORIDA'S SILVER SPRINGS

Underwater is home for this motor!

New Louis Allis Immersible motor is built to operate in water, sewage, or liquid chemicals

The Immersible motor can be adapted to operate in any kind of liquid — fresh or salt water, sewage, chemicals, or abrasive industrial cutting oils. It's the ideal means to provide power in a vat or sump — at the bottom of a pool, lake, or ocean!

No matter how deep your setting, the Immersible motor provides close-coupled power — saves you the need for expensive jack-shafting, intermediate bearing supports between pump and a surface-mounted motor, and mounting structures.

The motor is oil-filled and sealed at the factory. Diaphragm breathers equalize internal and external pressure — eliminate pressure at the shaft seal and prevent leakage. All joints are sealed to keep water and dirt out. Vinyl-coated housing and stainless or suitably plated exposed parts resist corrosion. Mating surfaces of the housing and flange are precisely machined to provide accurate alignment of the pump impeller and casing.

The Immersible, as shipped, is ready for horizontal or vertical mounting on pumps, agitators, mixers, or special equipment. Sizes range from ¾ to 40 hp. For additional information contact your local Louis Allis District Office, or write for Bulletin 2300, The Louis Allis Co., 448 E. Stewart Street, Milwaukee 1, Wisconsin. But do it today!

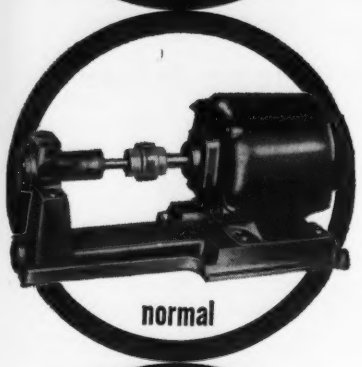
SM-169

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

Check 1309 opposite last page

What job do you have for a **VIKING PUMP?**



normal

heavy duty

Sizes From 2/3 to 1050 G. P. M. Capacities

There is a Viking positive displacement pump for most industrial pumping requirements . . . probably yours. If you need fast, self-priming along with positive, smooth delivery, Viking Pumps are your answer — whether liquids are thin or thick.

In the Viking Pump line there are 750 cataloged models in 20 sizes, with additional thousands of specially built pumps available. This wide selection assures you of the right pump to fit your needs.

So, install Viking Pumps! Save space; Save dollars! Save installation and operating time! And let one of the simple Viking "gear-within-a-gear" pumps do your job the way you want it done.

Send today for Catalogs
Section BCC and CCC

VIKING
PUMP COMPANY

Cedar Falls, Iowa, U.S.A.
In Canada, it's "ROTO-KING" Pumps
See Our Unit in Chemical Engineering Catalog

Check 1310 opposite last page

Removal system rids water of iron, manganese

Uses: Removing iron and manganese from industrial and municipal water supplies.

Features: System is adaptable for both large and small installations.

Description: Iron and manganese removal system is composed of a vertical, cylindrical pressure chamber into which compressed air is injected through a specially designed perforated distributing device near tank bottom.

Raw water, flowing through tank, becomes saturated with sufficient oxygen to oxidize any iron and manganese present in water before it reaches filter bed.

Flow of water through diffuser tank is automatically stopped and started by a solenoid valve, located in air line between compressor and diffuser tank. Valve is energized from the pressure switch controlling operation of the well pumps. Manual proportioning of the amount of air in relation to the amount of iron contained in the water is possible through a needle valve in the air line ahead of the solenoid valve. Free air entrapped in the water entering the filters is released when water strikes the distributor baffle in the top head of the filter tank. Air escapes through an automatic air relief valve adjacent to baffle.

(Iron and manganese removal system is available from Graver Water Conditioning Company, Div. of Graver Tank & Mfg. Co., Inc., 216 West 14th St., New York 11, New York.)

Check 1311 opposite last page.

NEXT MONTH

The passing of the "starch shoveler" at Corn Products Refining Co. will be featured in October CHEMICAL PROCESSING. Learn how starch-gluten separation process was modernized to obtain better uniformity and to upgrade labor force.

We Sell Filtration
NOT THE FILTER

At Shriver's we recommend the filter that's *right* for the specific processing conditions. This is done without prejudice or bias.

Of course, we design and manufacture an extensive line of pressure filters, suitable for a large majority of applications, but if our careful study of your filtration problem shows you need a vacuum filter or a pressure filter we do not manufacture, we tell you so frankly. Our aim: your satisfaction.

It's that simple, and has been paying off in customer goodwill for many years. We hope to continue meriting industry's confidence.

Literature on Shriver filtration equipment shown here will be gladly sent on request.

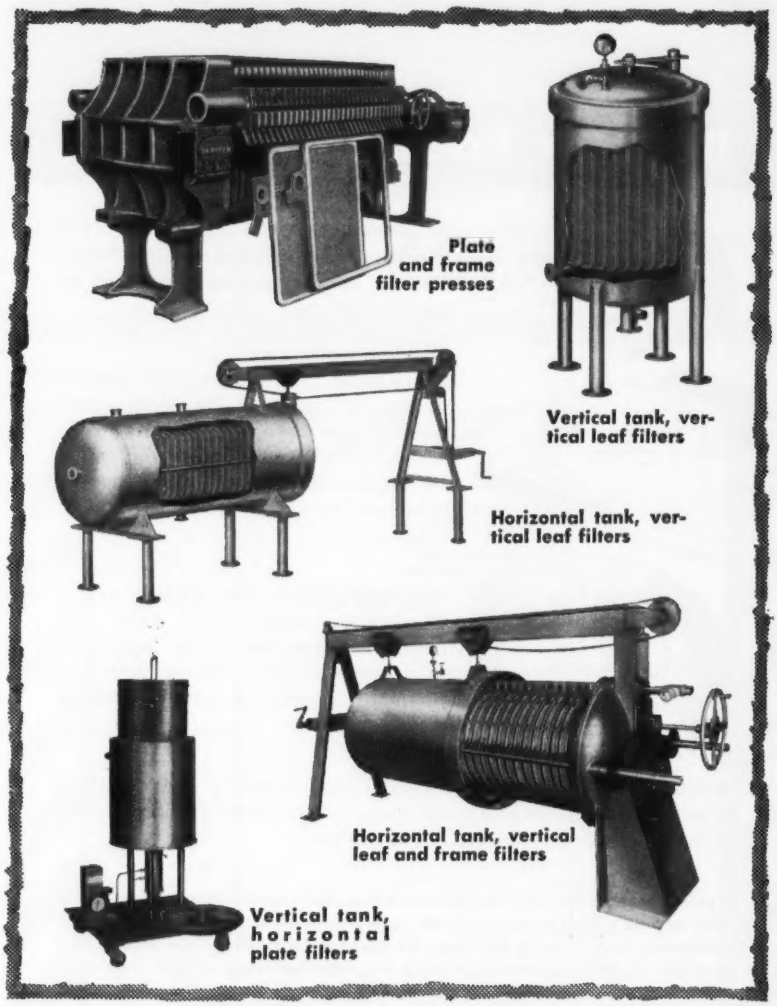


Plate and frame filter presses
Vertical tank, vertical leaf filters
Horizontal tank, vertical leaf filters
Horizontal tank, vertical leaf and frame filters
Vertical tank, horizontal plate filters

T. SHRIVER & COMPANY, INC.
846 HAMILTON STREET • HARRISON, N. J.

SALES REPRESENTATIVES IN: Decatur, Ga.—Houston, Tex.—Livonia, Mich.—St. Louis, Mo. San Francisco, Cal.—Montreal, Que.—Toronto, Ont.

FILTER PRESSES • VERTICAL LEAF FILTERS • FILTER MEDIA
HORIZONTAL PLATE FILTERS • CONTINUOUS THICKENERS
SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS

Check 1312 opposite last page

LOOK WHAT HAPPENS

when you

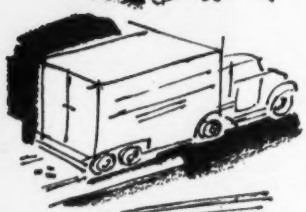
Call Cambridge

for

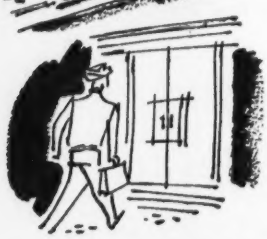
INDUSTRIAL WIRE CLOTH AND SCREEN

Bulk or Fabricated Parts

INQUIRIES ARE ANSWERED PROMPTLY—Whenever you call or write for information on prices, availabilities or service, you get a prompt reply.



DELIVERIES ARE MADE ON TIME—Orders for the most frequently used types of wire cloth are promptly filled. If we can't supply what you want from our complete stock, we'll schedule our looms to get it to you as soon as possible.



INSTALLATIONS ARE CHECKED—At Cambridge, orders aren't filled and forgotten. Our own sales engineers follow up your order to make sure our product is giving you the best possible service.

QUALITY, OF COURSE—Individual loom operation and countless checks on mesh size and mesh count assure you of highest quality wire cloth when you specify Cambridge.

Let us quote on your bulk or fabricated wire cloth needs. Samples for inspection or test purposes are available upon request. Call your Cambridge FIELD ENGINEER. He's listed in the phone book under "Wire Cloth." Or, write direct for FREE 94-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department F,
Cambridge 9,
Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Check 1313 opposite last page.

PROCESSING EQUIPMENT

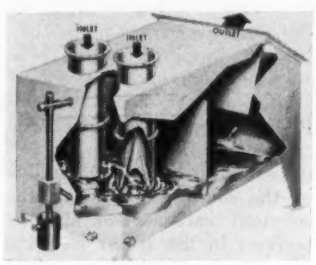
Simple wet-type scrubber features high efficiency, low maintenance

Pressure drop through unit is only 5-10" water

Uses: Scrubbing, cooling wide variety of dust-laden fumes and gases.

Features: Dust collecting efficiencies of 97 to 99 percent are obtained. Pressure drop through unit is low — averaging about 5 to 10" water. Scrubber can be used even in areas having low supply of water or other scrubbing liquid. Liquid requirements are approximately 1 to 5 gpm per 1000 cfm gas.

Description: Scrubber consists essentially of a sloping rectangular tank with impingement and eliminator sections separated by baffle plate across tank at right angles to



Wet-type scrubber uses about 1 to 5 gpm per 1000 cfm gas

gas flow. Impingement section contains overflow weir for controlling fluid level and gas inlet nozzle incorporating a cone for increasing gas velocity.

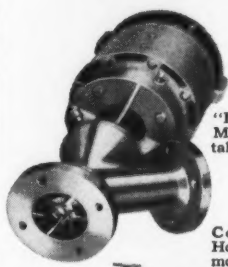
As dust-laden gases pass through inlet duct, their flow velocity is accelerated by conical nozzle centered in throat of duct and terminating just above surface of scrubbing liquid. Relatively high gas velocity produced by this jetting action causes dust particles to drive deeply into scrubbing liquid. Scrubbing liquid overflows constant-level weir and carries away dust particles separated from gases.

Eliminator section contains baffle arrangement for drying the gases before they are discharged from outlet port. Also located in this section is an outlet for introducing clean

Now Available!

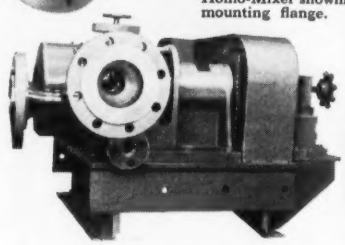
CONTINUOUS FLOW HOMOGENIZING AND MIXING

with G-W Eppenbach "Pipe-Line" Homo-Mixer



"Pipe-Line" Homo-Mixer showing intake turbine.

Continuous Flow Homo-Mixer showing mounting flange.



Gifford-Wood "Eppenbach" now provides blending equipment for processing of emulsions, slurries, suspensions, and related mixtures on a continuous flow basis.

Only the G-W Homo-Mixer brings you both continuous flow mixing and high-speed high-shear homogenizing.

Operation is ordinarily "one pass." For further refining, material may be re-circulated or units may be connected in series. The result—highly refined dispersions of small particle size. Write for details.

4038

GIFFORD-WOOD CO.

Eppenbach Div., Dept. CP-9
Hudson, New York
Please send me your free Eppenbach Fact Book.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

Check 1314 opposite last page

scrubbing fluid into tank as dust-laden fluid flows out.

Because of its simple design, scrubber can be made of various types of material. This includes mild steel, lead, wood, and stainless steel. Unit handling 15,000 cfm measures about 6x8x10′ long. Scrubbers have low initial cost and require only minimum mair.tenance.

(Turbulaire-Doyle scrubbers are product of Western Precipitation Corporation, 1000 West Ninth Street, Los Angeles 54, California.)

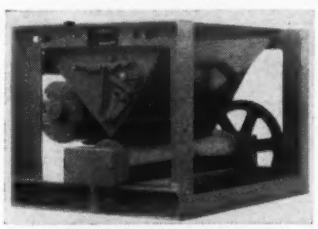
Check 1315 opposite last page.

Rotating field separator removes tramp iron fast, efficiently

Magnets revolve within a stainless cylinder

Uses: Removing tramp iron and other magnetic contaminants from chemicals, grains, foods, and similar dry materials.

Features: No moving parts come in contact with material being separated. Magnetic field is created by permanent magnets revolving inside a stainless steel cylinder. Power required to drive units is very low.



Magnetic field in separator is created by permanent magnets rotating inside stainless steel cylinder. No moving parts come in contact with materials being processed

Description: Rotating field magnetic separators are available in 6″ (effective field lengths), 18″, and 36″ sizes. Units can be stacked together for multiple passes, or can be used separately for large tonnage throughput.

Machines were originally developed for use in mineral beneficiation industries for separating magnetite and other highly magnetics from dry, granulated products.

(Rotating field magnetic separators are product of Carpco Manufacturing, Inc., 4120 Haines Street, Jacksonville 6, Florida.)

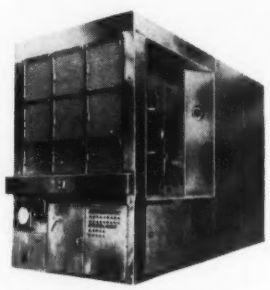
Check 1316 opposite last page.

'Pushbutton' spray dryer comes pre-assembled, ready for use

Installation consists only of making few connections

Uses: Spray drying various products in chemical, food, and allied industries.

Features: Spray dryer is a completely packaged unit, coming with starters, fuses, disconnects, and other necessary components. Installation consists of making only a few connections. Operation is strictly by "pushbutton" control.

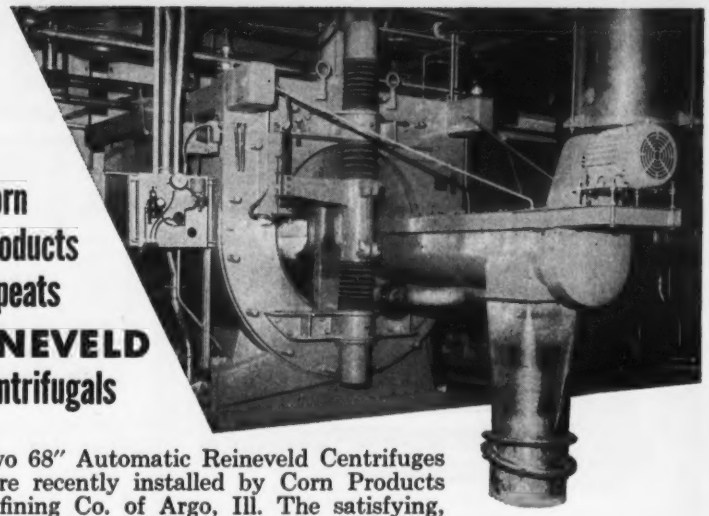


Spray dryer is constructed entirely of stainless steel; comes complete with all controls

Description: Unit uses drying method called "horizontal air suspension". Process keeps all powder — even heavier particles — suspended in air during seven-second drying cycle. Dryers are constructed entirely of stainless steel. All parts are easily accessible for cleaning. Connections for automatic spray cleaning equipment are available as optional equipment.

(Automatic spray dryers are product of Henszey Company, Watertown, Wisconsin.)

Check 1317 opposite last page.



Corn Products repeats REINEVELD centrifugals

Two 68″ Automatic Reineveld Centrifuges were recently installed by Corn Products Refining Co. of Argo, Ill. The satisfying, trouble-free operation from the very start and the excellent quality of the centrifuge product resulted in a prompt repeat order. Heyl & Patterson offers a complete line of centrifuges that perform well from every angle.

Consult our listing in CEC or write for bulletin 356.

Sold and Serviced by:

Heyl & Patterson INC.

55 FORT PITT BLVD. · PITTSBURGH 22, PA

Check 1318 opposite last page

Raschig Ring

Single-Partition Ring

Cross-Partition Ring

Berl Saddle

Tellerette

Designed for Service!

KNOX TOWER PACKINGS

KNOX manufactures tower packings from the same composition as is used in our high voltage electrical porcelain. This assures you the utmost in Quality at minimum cost.

- KNOX Tower Packings resist high temperatures, fumes, vapor, corrosion.
- Resistant to alkalis, acids, liquids
- Complete vitrification firing provides zero porosity, assuring indefinite life chemically.
- Uniform quality, high chemical purity, iron free, great mechanical strength, will not crumble.

Know your source. Buy direct from KNOX. A wide range of designs, plus modern production methods, gives you a Better Tower Packing.

On special porcelain items send samples or drawings for quotations.

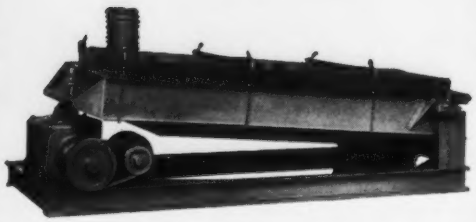
KNOX PORCELAIN CORPORATION
KNOXVILLE 1, TENNESSEE

Always Specify KNOX Tower Packings

Check 1319 opposite last page

ROTEX®

SCREENERS GIVE



PROFITABLE PRODUCTION!

ROTEX FEATURES

- Low head room
- No screen blinding
- Fast screen changes
- Dependable service
- Dust-tite construction
- Rugged construction

For over 40 years ROTEX Screeners have been widely used throughout industry. Today there are installations in the United States and over 25 foreign countries. Built for dependable service, ROTEX are long known for accuracy, capacity and operating economy.

ROTEX SCREENING ACTION:

The nearly level, gyratory motion, pioneered in ROTEX, conveys materials rapidly over screen surfaces with minimum vertical vibration or hop. This stratifies the material by particle size, rapidly passing undersize particles through the mesh openings. The results are clean separations of exacting accuracy coupled with high capacity. Designed for operating convenience, ROTEX Screeners pay for themselves by the economies they effect.

ROTEX WIDE SELECTION:

To meet your requirements: 25 standard models—one to five screen surfaces—many semi-standard and special models—sanitary and all-metal construction available.

Write for Bulletin 401 and information on your screening requirements. Our engineering staff will be pleased to cooperate with you.

MECHANICAL FEATURES

All Metal Screen Box
Self-Aligning Slide Bearings
Quiet Running Counter-Balanced Drive
Heavy Welded Structural Steel Base

ROTEX | The Orville Simpson Co.
1246 Knowlton St., Cincinnati 23, Ohio

Check 1320 opposite last page

PROCESSING EQUIPMENT

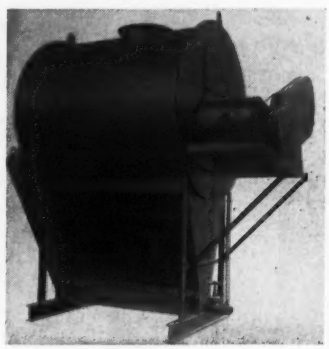
Air, gas at 2000°F washed efficiently by scrubber

Uses: Unit is designed for removing dust and other particles from hot air or gas streams.

Features: Compact washer, less than 15′ high, resists temperatures up to 2000°F.

Description: According to manufacturer, hot gas washer does away with need for expensive brick-lined stacks, settling chambers, fans, and gas washing equipment.

In operation, dust-laden gases enter unit through side opening and are subjected to fine water sprays which cool the gases and wet the suspended particles. Centrifugal force causes particles to impinge on wet surface of primary separation chamber. Particles then flow down to settling tank where they precipitate to bottom.



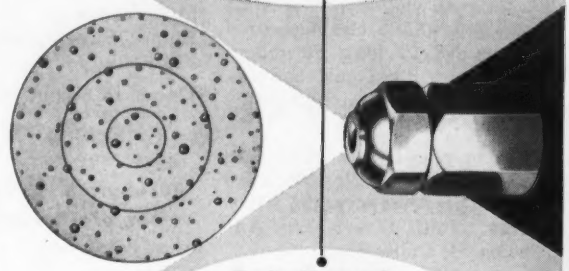
Hot air, gas scrubber resists temperatures up to 2000°F

Gases from primary separation chamber flow on into an induced-draft fan chamber, where dynamic action impinges remaining particles on the chamber's wetted surface. Particles flow down, are entrapped in turbulent water, and drop to bottom of settling tank. Clean gases pass through a water eliminator chamber before being exhausted from unit.

(Dynamic Hot Gas Washer is product of Lehigh Fan & Blower Division, Fuller Company, Catasauqua, Pennsylvania.)

Check 1321 opposite last page.

SPRAY NOZZLES
to control LIQUID PARTICLE SIZE
and FIELD DISTRIBUTION
with ACCURACY

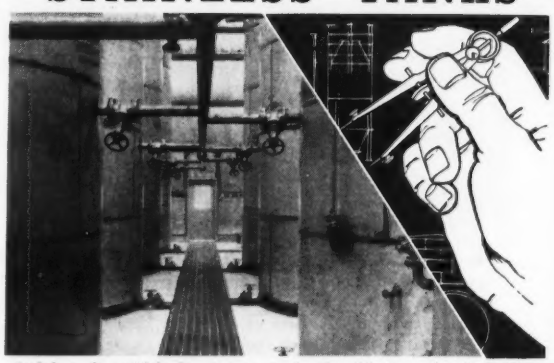


For liquid-gas and liquid-solid contact operations to accomplish physical mixing, chemical reactions or heat transfer, Spraying Systems spray nozzles are available to give you any liquid particle size and spray field distribution you may require. Standard spray nozzles are offered in an unusually wide range of types and capacities . . . special designs are gladly supplied when needed.

SPRAYING SYSTEMS CO.
3216 Randolph Street • Bellwood, Ill.
For complete information we invite your inquiry for Catalog 24

Check 1322 opposite last page

from blueprint plans
PUGET SOUND FABRICATES
STAINLESS TANKS



Stainless formaldehyde storage tanks for Western chemical plant

...for the Chemical Processing Industry on the West Coast.

You can save on transportation costs, manufacturing time and gain the dependability of over 58 years of custom fabricating experience when you call on Puget Sound as your West Coast source for process and plant equipment in steel plate and alloys up to 1". Send prints for prompt quotation on your next job.

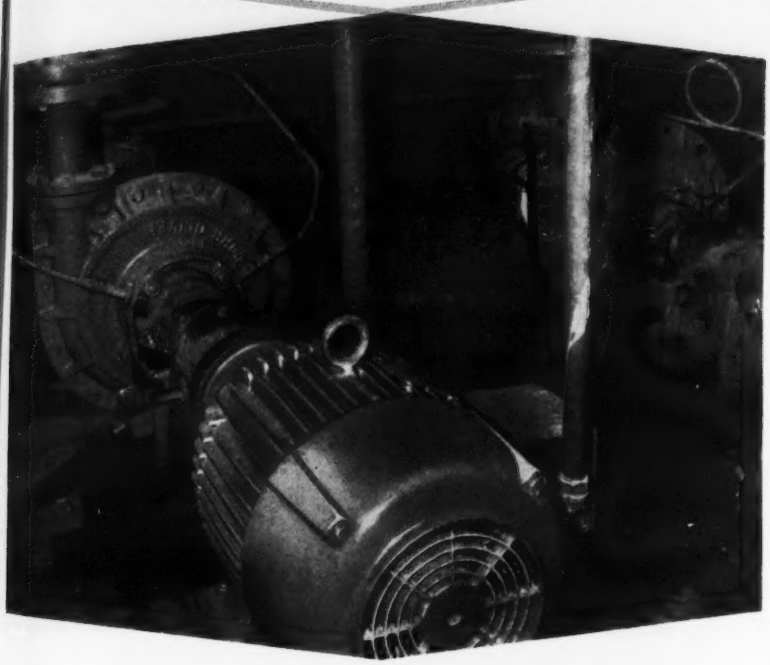
Request Brochure No. M-58

PS F Craftsmen in Metals FOR INDUSTRY

PS F SINCE 1900
PUGET SOUND FABRICATORS, INC.
Craftsmen in Metals
3670 E. Marginal Way • Seattle 4, Washington

Check 1323 opposite last page

only DORR-OLIVER makes
3 DIFFERENT PUMP TYPES
for complete chemical coverage



First Dorr-Oliver Hypalon-lined PUMPS STILL GOING STRONG at Kennametal Inc.

Handling neutralized wastes from nitric, muriatic, and hydrofluoric acid leaching operations which occasionally, due to large process surges, are not completely neutralized calls for corrosion and abrasion-resistant pumps.

The job is handled at Kennametal's Kingston Station Plant, Latrobe, Pennsylvania, by four Olivite pumps, two of which are shown above. Still going strong after long and continuous use, these pumps have the distinction of being the first units manufactured by Dorr-Oliver with a lining of Dupont's Hypalon elastomer. Kennametal reports that no repairs have been necessary.

Satisfactory performance has made this type of pump the choice for a wide range of applications where resistance to corrosion is the important factor. It is one of the three specialized pump types made by Dorr-Oliver—the only major manufacturer offering complete coverage of chemical industry pumping requirements. For more information, write for Bulletin No. 5000.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

Olivite—T.M. Reg. U.S. Pat. Off. Hypalon—Reg. T.M. E. I. duPont de Nemours & Co.

Check 1324 opposite last page

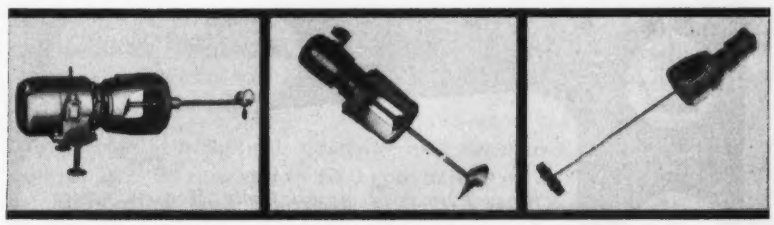
EASTERN MIXERS

mix fluids quickly . . . thoroughly

EASTERN'S COMPLETE LINE of fluid mixers range from fixed-mounted 40 H.P. turbines and heavy-duty propeller mixers to lightweight portables. Where fixed-mounted installations are not required, Eastern Portables offer versatility, ease of handling and long-term cost savings.

Portables are available with speeds of 420, 1125 and 1725 R.P.M., rated from 1/20 to 3 H.P. as standard, with variable speed and air-driven models also available. Motors in all standard types can be supplied in open drip-proof, totally-enclosed, or explosion-proof construction. Shafts and single or dual propellers are available in a choice of alloys for all service requirements. New optional ball-swivel clamp as illustrated, permits easy adjustment of mixer position in tank.

For a personalized analysis of your mixing problems, send details to Eastern engineers. A recommended solution will be furnished promptly and without obligation. For a helpful guide to mixing fundamentals, write for "Handbook of Fluid Mixing."



SIDE-ENTERING MIXERS
Handle the extra heavy-duty jobs in big tanks. Sizes ¼ to 30 H.P. Send for Bulletin 620.

TOP ENTERING MIXERS
Designed for heavy-duty applications requiring agitators from ¼ to 10 H.P. Send for Bulletin 620.

TURBINE MIXERS
Range of ¼ to 40 H.P. solve many special mixing problems. Send for Bulletin 1210.

NEW PORTABLE MIXER BULLETIN

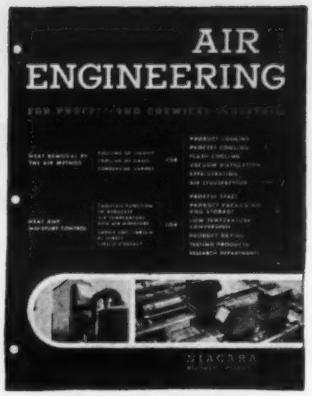
Eastern's improved line is included in the revised Bulletin No. 530.

Eastern
INDUSTRIES, INC.
Dept. A-4, Norwalk, Conn.

EASTERN INDUSTRIES MIXER DIVISION

Check 1325 opposite last page

AIR ENGINEERING by NIAGARA



- AIR CONDITIONING with precise regulation of air temperature and air moisture for processing, for product drying, packing, storing, low temperature conversion, for testing and research.
- "NO FROST" REFRIGERATION for food and low temperature conversion, for testing and operations at extreme low temperatures; for moisture control below the freezing point of water.
- AFTER COOLING and air drying for large air and gas compressors and AIR LIQUEFACTION.
- COOLING ENGINES, COMPRESSORS, HYDRAULIC PRESSES.
- COOLING QUENCH BATHS, FURNACES, INERT ATMOSPHERES.
- COOLING ROLLS, WELDERS, DRAWING OR EXTRUSION DIES.
- PRODUCT AND PROCESS COOLING CHEMICALS OR INTERMEDIATES.
- COOLING LIQUIDS OR GASES IN CLOSED SYSTEMS.
- VAPOR CONDENSING UNDER VACUUM.
- REFRIGERANT CONDENSING.
- ELECTRONIC PROCESS COOLING.

You will reduce your costs, solve your problems of water supply or disposal and get HIGH OPERATIONAL EFFICIENCY with Niagara "Aero" Evaporative Heat Exchangers, After Coolers, Condensers, Air Conditioners or Coolers for these important plant services or processes.

High operational efficiency means: precise temperature for improved product and process quality control, heat removal at rate of input, simple operating conditions, real economy in upkeep, sustained full capacity. It means the lowest expense for up-keep.

Write for this Bulletin No. 135

Write for Bulletin 135

NIAGARA BLOWER COMPANY

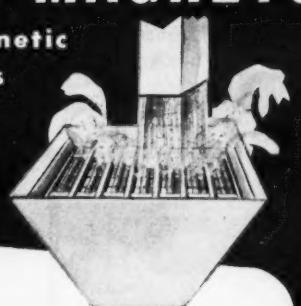
Dept. CP-9, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 1326 opposite last page

DINGS GRATE MAGNETS

for positive, low-cost magnetic protection in trouble spots that are difficult to guard . . .



Under, over or in steep-sloped hoppers

Mounted in floor openings

Drawer-type for vertical ducts

At discharge end of conveyors or spouts

Dings Permanent Alnico Grate Magnets assure positive protection from tramp iron damage in trouble spots which never before could be effectively guarded. They are the only units of this type designed with unshielded magnets which contact the material directly to provide powerful attraction for fine particles of fuzz iron as well as larger pieces of tramp iron Recommended for powders and granular materials. Both wing and drawer types available in sizes and shapes for every need.

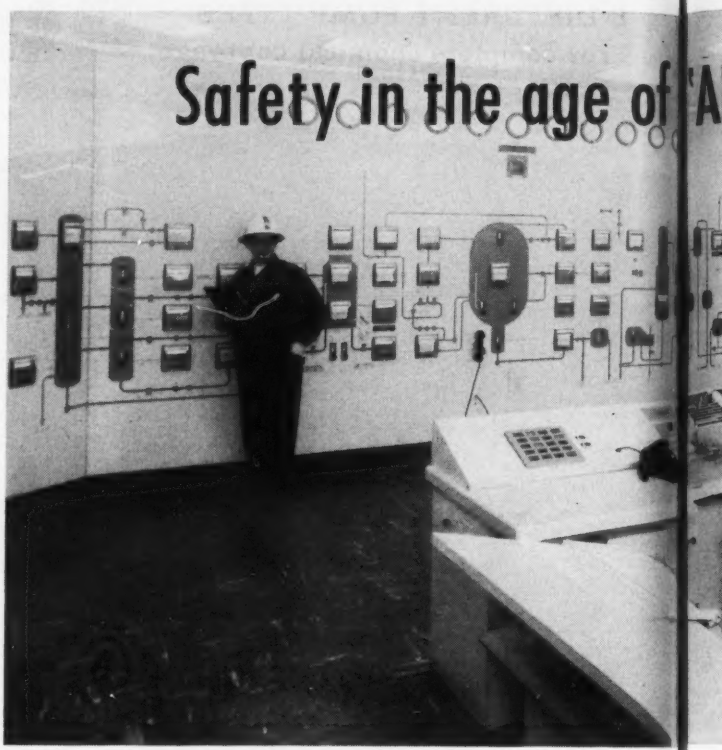
Write for details in Bulletin 1213A.

DINGS MAGNETIC SEPARATOR CO

4731 W. Electric Ave.
Milwaukee 46, Wis.
G-158½

Dings

Check 1327 opposite last page



Just because a highly instrumented system has increased safety in operations at Tidewater's Delaware Refinery, management there has not relaxed its promotion and supervision of personnel safety.

In a panel discussion[1] on the "automatic processing plant," it was brought out that the primary objective in engineering such a plant was to increase safety. Highly instrumented systems were engineered to eliminate having men enter hazardous areas — and, of course, to reduce the human factors. Incidentally, placing safety first puts product quality and increased productivity — two factors generally thought to be the top reasons — into the second and third spots.

Fearing that workers in such plants might adopt this "increased safety" philosophy in their attitude toward their jobs and grow lax in safety practices, The National Safety Council came out with a warning in one of its booklets urging workers not to overlook personal safety in the "age of automation."[2] "In a pushbutton world," says the Council, "there's no button to make you safe."

Here's what J. Victor McCool, safety supervisor at Tidewater Oil Company's Delaware Refinery, will tell you: "Although automation contributes much to industrial safety, education is still es-

[1] *A CP Panel Report*, CHEMICAL PROCESSING, Sept. 1957, p. 42.

[2] "Do We Still Need Safety," National Safety Council, 1956

of 'AUTOMATION'

One control room at Tidewater's Delaware Refinery. Safety practices here haven't been relaxed because of plant's highly automatic nature

British Petroleum Co.'s chief safety engineer (right) studies Tidewater's safety equipment and program. Here safety supervisor J. Victor McCool (left) demonstrates safety shoes to the British visitor

sential", he points out strongly.

"The most up-to-date safety equipment in the world will never make a safe plant unless those using the equipment are well grounded in safety principles."

These words reflect exactly the philosophy that is being followed at a plant that has been described as "a pacemaker in automatic processing." It is the philosophy that underlies Victor McCool and his staff's program — a program that includes safety training for every employee.

Pressurized control houses, a refinery-wide blow-down system, CO_2 ceiling sprinklers, automatic fire-proof doors, electronic warning signals, and many other protective installations are built-in safeguards which have been incorporated in the refinery's design. But you can't get away from the fact that people are the governing factor in making a plant's operation a safe one.

The success of the refinery's safety program — a continuing one of education and guidance along lines of proved accident-prevention practices — is borne out by its accident frequency rate for 1957 — a low 3.68.

Under that program, all employees other than those of supervision level receive a two-hour conference course known as "Principles of Safety for Employees." The course's objective is to fix in the mind of every employee the axiom that he has a per-

CHEMICAL PUMP *Can Run Dry*

Continuous or Intermittent Service Handled By ECO GEAR-CHEM* Pump.

If your process demands:

- Continuous or Cyclic Wet or Dry Operation
- Self-Priming Characteristics
- Full or Restricted Flows
- Linear & Reproducible Flows
- Metering Accuracy
- Reversible Operation
- Freedom from Contamination
- Temperature, Viscosity & Pressure Changes

Specify the ECO CARBON GEAR-CHEM* *Pump.*

Viscosities to 5000 SSU • Temperatures to 450° F.

Carbon spur gears are fully machined and ground, dimensionally stable and resistant to mechanical and thermal shock. Chemically unaffected by a wide range of corrosive media, carbon gears efficiently handle lubricating and non-lubricating fluids. Pump can be steam or chemically sterilized. Self-lubricating carbon bearings eliminate all problems of product contamination.

The carbon gear pump is available in 2 sizes: to 2.5 gpm at 100 psi at 1750 rpm and to 10.0 gpm at 100 psi at 1750 rpm. Pump housings and shafts of Type 316 or Carpenter 20 stainless steel, nickel or Hastelloy C.

Write for complete data and state your requirements for immediate attention.

**Registered Trade Mark*

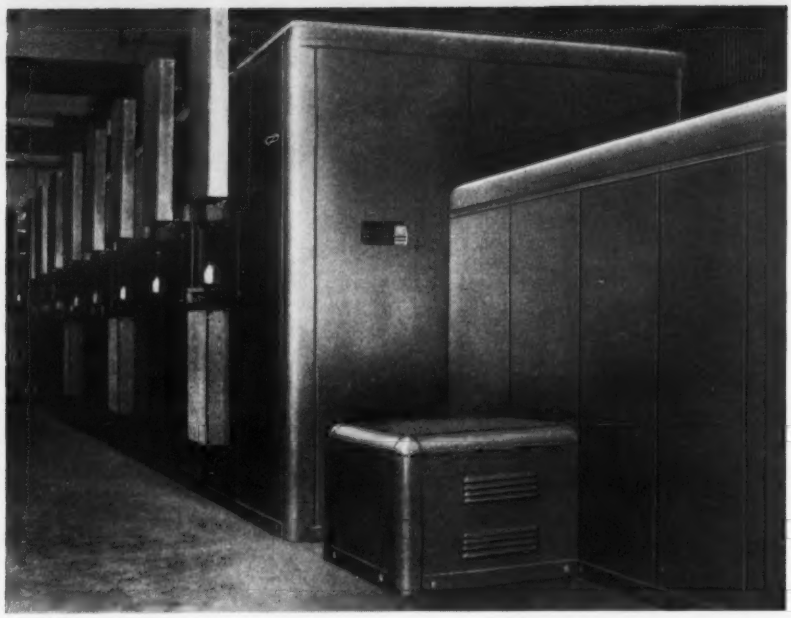
ECO ENGINEERING CO.

the big name in small pumps

MArket 4-6565

12 NEW YORK AVE. NEWARK, N. J.

Check 1328 opposite last page



"NATIONAL" PERFORATED APRON CONVEYOR DRYER

Evidence of the outstanding efficiency and economy of this "National" drying unit is found in the number of existing and on-order installations among the Nation's leading chemical manufacturers.

Increased drying capacity per square foot of surface; improved uniformity of dried product; much easier apron cleaning; greater efficiency and accessibility of gas or steam heaters; and a generally neater machine to operate and maintain, are characteristics of this drying system resulting from unique and exclusive features of "National" design, construction, operation and control.

The same type of dryer is used by the Nation's leading manufacturers of synthetic fibres.

The following well-known companies are among the current users of "National" Perforated Apron Conveyor Dryers:

AMERICAN VISCOSE CORPORATION
ARMOUR & COMPANY
THE PHILIP CAREY MANUFACTURING CO.
DAVISON CHEMICAL COMPANY, DIV. OF W. R. GRACE & CO.
DU PONT COMPANY OF CANADA (1956) LTD.
E. I. du PONT de NEMOURS & CO.
THE GENERAL TIRE & RUBBER CO.
CONGOLEUM-NAIRN, INC.
O. M. SCOTT & SONS CO.
A. E. STALEY MANUFACTURING CO.
AMERICAN ENKA CORP.
NATIONAL ANILINE DIVISION, ALLIED CHEMICAL & DYE CORP.
NATIONAL METAL EDGE BOX CO.
CANADIAN INDUSTRIES, LTD.
RADIO CORPORATION OF AMERICA
THE DOW CHEMICAL CORP.
CHEMSTRAND CORP.
UNION CARBIDE & CARBON CORP.

Write for Literature Describing These "National" Dryers and Typical Installations.

THE NATIONAL DRYING MACHINERY COMPANY
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass. • *Southern Agent:* F. W. WARRINGTON, Charlotte, N. C.
Cable Address: "NADRYMA"—W. U. Code

Check 1329 opposite last page

sonal interest in performing his job safely.

Unit operators and general service operators who assist the operators in maintenance of equipment receive an additional two hours of instruction in the use of safety equipment. Respirators, gas masks, test equipment, and protective clothing must become familiar apparatus to these men whose jobs put them in the front line of accident prevention.

A ten-hour industrial first-aid course is taught to many employees by refinery instructors who were themselves trained and qualified by the Red Cross. The refinery was the first industrial plant in the Delaware Valley to adopt this Red Cross approved training course.

Supervisory personnel receive a more intensified safety instruction through a five-hour conference course covering basic accident-control by first-line supervisors.

Specialized Sessions

In addition to regular safety classes, specialized lectures and instruction sessions in safety are held for employee groups whose duties are of a particular nature. For example, in July of last year, a two-day lead-hazard clinic was held for men who work in areas where tetraethyl lead is handled and stored. The discussion was conducted by toxicity and operations experts of the Du Pont Company. Tidewater management has considered the clinic highly successful, and it will be repeated.

Completion of the regular safety courses does not mean the end of safety training for plant employees. Periodic refresher courses are conducted regularly.

The safety department's work covers not only the training courses, but a multitude of other functions. There is the preparation of weekly or bi-weekly memoranda on various aspects of safety for distribution to all employees, as well as monthly frequency and severity reports for supervision. Regular inspections of conditions such as house-

keeping and safety and first-aid equipment and installation is another.

The department is also responsible for issuing entry permits to vessels and tanks, for reporting to fires, for investigating accidents, and for coordinating safety coverage with two outside concerns handling maintenance and service work within the refinery.

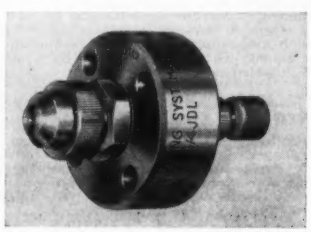
The fire, medical, and training departments, although completely separate and autonomous, work closely with the safety department. In many areas their duties overlap with those of the safety department to provide additional safety supervision for the refinery.

Spraying system nozzle fits any wall thickness

Easy, leak-proof installation

Uses: For company-engineered spray nozzle applications.

Features: Unit fits any wall thickness and provides easy, leak-proof installation. It may



Body acts as flange of atomizing nozzle; fits any wall thickness

be transferred and reused with later installations, no matter what the new wall thicknesses may be.

Description: Body acts as flange of pneumatic atomizing nozzle for spraying system. Nozzle is available in choice of brass or Type 303 stainless steel with rear shut-off needle, clean-out needle assembly, or plug only.

(¼ JDL pneumatic atomizing nozzle is available from Spraying Systems Co., 3216 Randolph St., Bellwood, Ill.)

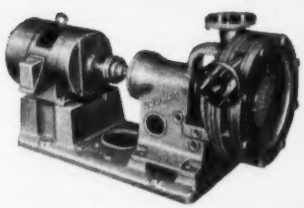
Check 1330 opposite last page.

Which ones do *you* want licked?

They're all sour—when you have to pump corrosives. You can lick all four when your pump is made of the right materials.

You know what you have to pump. We know how to furnish pumps to handle it.

We'd like to hear your problem.



GOULDS-PFAUDLER GLASSED PUMP. Here's a unique new centrifugal pump that joins the unexcelled corrosion resistance of Pfaudler glass to the sturdy construction of Goulds pumps. For complete details, send for our Bulletin 725.2.

GOULDS

PUMPS FOR INDUSTRY

GOULDS PUMPS, INC.
Dept. CP-98, Seneca Falls, N.Y.
Main Office and Works

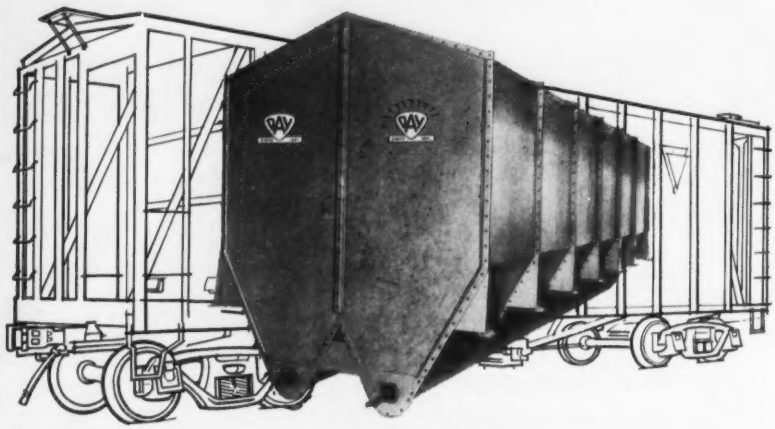
Branches and Representatives in all principal cities

CREATIVE ENGINEERING • INTEGRATED MANUFACTURING • ENGINEERED APPLICATIONS

Check 1331 opposite last page

DAY

BULK STORAGE NEWS

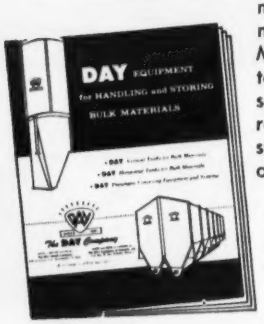


A CARLOAD OF STORAGE IN ONE 'PACKAGE'

SAVE! Store Chemicals in bulk with DAY Tanks

Here's a "package" that's engineered and built for heavy duty service. Compared to bags or other containers, DAY Bulk Tanks store more materials, in less space, faster, better and cheaper. By eliminating bag and labor costs they save up to 35¢ on every 100 lbs. of bulk material handled.

DAY tanks are large enough to actually store a carload or more of material in a single tank. They may be pneumatically or mechanically loaded and emptied. Made in vertical and horizontal styles, DAY tanks are built and shipped in easily erected sections. They have been proven in a wide range of applications. They are sturdily constructed of galvanized, black or stainless steels or aluminum.



Write toDAY for Bulletin 574. This 12-page booklet gives specifications plus money saving facts about sanitary, weatherproof DAY tanks.

The **DAY** *Company*

SOLD in UNITED STATES by
The DAY SALES Company
852 Third Ave. N.E., Minneapolis 13, Minn.

MADE and SOLD in CANADA by
The DAY Company of Canada Limited
26 Brydon Dr., Rexdale (Toronto), Ont.

For DAY office nearest you refer to our advertisement in Chemical Engineering Catalog.

EQUIPMENT ONLY OR A COMPLETE SYSTEM

Check 1332 opposite last page

For quick de-rusting utilize cleaning gun that's air powered

Even hard-to-reach points de-scaled easily

Uses: De-rusting, de-scaling, cleaning, and surface preparation of metal, stone, or masonry.

Features: Use of cleaning gun does not interfere with regular production. Work is done on-the-spot. Protective devices are not necessary since there are no flying particles of sand, scale, or shot. Needles and chisels reach relatively inaccessible points including weld seams, laps, rivet runs, and angle plates.

Length, in	19-20
Weight, lb (including needles)	5½-13
Air consumption, cu ft/min	9-13
Power requirements, lb/sq in	86-114

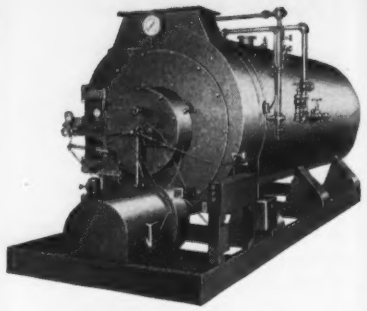
Little or no dust is raised. Air continually flows over working surface, removing rust or paint, and leaving surface visibly clean.

Description: Cleaning gun is air-powered. Air from compressor drives hardened steel needles which move as a unit with needle holder. Needles are free at end of stroke to move individually to reach into pits or around projections. Action is controlled by a trigger or handle.

Air-powered cleaning gun is safe, easily operated

(Von Arx cleaning gun is a product of Von Arx & Co., 7775 Sheridan Drive, Buffalo 21, N.Y.)

Check 1333 opposite last page.



Here's CYCLOTHERM'S 3-WAY CUT in STEAM PROCESSING COSTS!

If you process by steam, use steam by Cyclotherm. You cut costs in these three vital ways:

FUEL COSTS

Cyclotherm Cyclonic Combustion means just what it says—controlled fuel and air, whirling at 200 mph, forming a cyclone in the furnace! This high velocity burning assures maximum efficiency in combustion and heat transfer, resulting in lower fuel consumption.

MANPOWER COSTS

A fire without a fireman! Electronic controls operate the Cyclotherm safely and automatically. Smaller models cycle on and off as steam is required. On larger models, precision modulation coordinates the fuel-air ratio to the load demand, from 30% to 100% of rated capacity.

INSTALLATION AND MAINTENANCE COSTS

Cyclotherm is factory assembled and factory pre-tested. All you do is make five simple connections. 50% maintenance savings are not uncommon. Return tubes cleaned in minutes with no removal or replacement of refractories. No standby unit needed.

And remember—one-third smaller than ordinary generators of similar capacity, a Cyclotherm fits almost anywhere. Many plants have installed two Cyclotherms for utmost flexibility and power. Burns gas or oil with quick changeover. 18 to 500 hp, 15 to 200 psi.

YEARS AHEAD IN STEAM & HOT WATER GENERATION
CYCLOTHERM®
STEAM AND HOT WATER GENERATORS

Cyclotherm Division,
National-U. S. Radiator Corp.
61 E. First St., Oswego, N. Y.

Please send me a free copy of your booklet giving full information on Cyclotherm Steam and Hot Water Generators.

Name .....
Company .....
Address .....
City ..... Zone ..... State .....

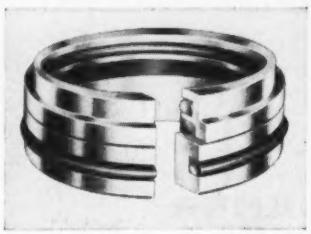
Check 1334 opposite last page

Simple mechanical seal retains even pressure, uses magnetic force

No breaking-in period; seal remains tight

Uses: Packing or sealing applications in pumps, compressors, or on any rotary shaft where liquids, gases, or corrosives are to be sealed.

Features: Magnetic force retains an even pressure on the optically flat sealing surfaces regardless of operational pressures. There is no breaking-in period required, and the seal remains tight indefinitely.



Magnetic force of mechanical seal retains even pressure

Description: Simple mechanical seal has just two working parts held together by magnetic force. Seal, formed between self-lubricating carbon and Alnico metal lapped faces, is so tight not even a molecule of helium gas can leak through.

Seals will fit in any stuffing box; are easily installed without the use of set-screws.

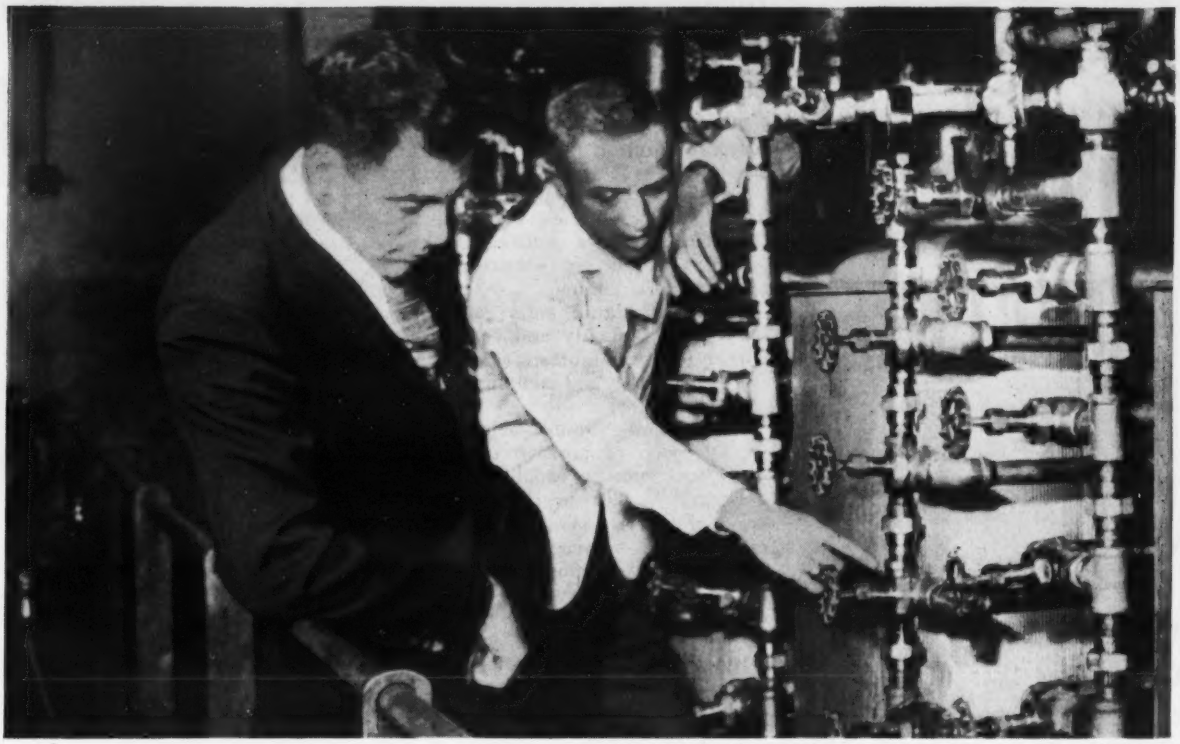
(Magnetic seal is product of A. W. Chesterton Co., 6 Ashland St., Everett 49, Mass.)

Check 1335 opposite last page.

Fire protection

Carbon dioxide fire extinguishing systems, fire detection equipment, ultrasonic and photo-electric burglar detection systems are covered in eight-page bulletin. Chart outlines the suitability of portable fire extinguishers for use on various types of fires. Bul I-19 — Walter Kidde & Co., Inc., 675 Main St., Belleville 9, N.J.

Check 1336 opposite last page.



Joseph Smindak (right), Plant Engineer, Coffee Instants, Inc., Flushing, N.Y. Left, Michael De Piano, N.Y. representative, Cooper Alloy Corp. Foreground, Cooper Alloy 1" stainless Union Bonnet Globe Valves.

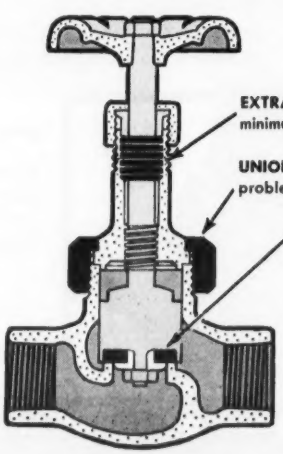
SMINDAK of COFFEE INSTANTS, INC.

Tells why he specifies Cooper Alloy for stainless steel valves and fittings

Q. Mr. Smindak, why does Coffee Instants, one of the nation's leading instant coffee processors, use stainless valves and fittings in processing their product?
A. To protect product purity, a must with us as with most other food processors. Contact with other metals can degrade flavor and aroma; stainless steel does not.

Q. Why Cooper Alloy?
A. Because of the special Cooper Alloy construction features I find combined in no other brand. On these Cooper Alloy union bonnet globe valves, for example, we like the ease of operation and the low maintenance; the fact that it removes a threaded joint from product contact; and in particular, the extra-deep square-compression stuffing box which reduces maintenance, gives a tighter seal at stem. Then too, the excellent service we get from Cooper Alloy sales people and distributors.

Q. You don't find these features in any competing valve?
A. Frankly, not one has them all. That's why, for our stainless valves *and fittings*, we insist on Cooper Alloy.


EXTRA-DEEP STUFFING BOX holds minimum 6 turns Blue African asbestos
UNION BONNET JOINT eliminates problems found in screwed-in bonnets
RETAINED RENEWABLE DISC for tight seal and long life

COOPER ALLOY Figure 15RD Globe Valve, inside screw rising stem, 200-lb. service, screwed ends, renewable retained disc of composition you specify.

YEARS AHEAD IN DESIGN SUPERIORITY! No matter what your valve type—globes, gates, angles, checks, or Y's—the Cooper Alloy model's outstanding design features will be important to you. Cooper Alloy, with 35 years of pioneering experience in stainless steel, does not merely adapt existing brass and iron valve patterns; it creates valves *designed to be cast in stainless!* **Check the special design features of valve shown at left.**

As the little CA man below is saying: "*You Can Tell A Cooper Alloy Valve As Far As You Can See It!*" Write today for *your* copy of our folder "Design Factors In Stainless Steel Valves." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves *and fittings*, and their advantages. He can serve you promptly from local stocks.

COOPER ALLOY
Corporation • Hillside, New Jersey
VALVE & FITTING DIVISION
THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

Check 1337 opposite last page

FLEXIBLE TUBING

Made from

TEFLON*

For

Chemical Feed Lines (laboratory, catalyst, pilot plant reusable), Hot Corrosive Liquids or Steam Lines, Hydraulic Hose, Braiding and Fittings for Pressure Use

And Similar Applications Where Only PF TEFLON* Can Do The Job

PROPERTIES

- complete chemical inertness
- lowest coefficient of friction of any solid material
- very low permeability
- widest service temperature of any plastic (-450°F to +500°F)
- easily cleaned and sterilized without deterioration

Pa. F. flexible tubing is available in a full range of colors and sizes. Our extrusion techniques yield maximum service flexibility and all sizes are carefully inspected and controlled dimensionally.

Write, wire or 'phone for additional details, competent engineering assistance and prompt attention to special sizes and walls. Pressure testing and certification upon request.

PENNSYLVANIA FLUOROCARBON CO., INC.

1115 N. 38th St., Phila. 4, Pa., EV 6-0603

*"Teflon"—DuPont trade name for Tetrafluoroethylene resin

TWX PH 252

Check 1338 opposite last page

ENGINEERING & SAFETY

Duplex diaphragm pump simple to maintain, easy to clean

Uses: Unit is designed to handle heavy slurries, corrosive and abrasive materials, and fluids that are sensitive to mechanical jarring.

Features: Liquid ends can be removed quickly and easily in a few minutes, facilitating cleaning and simplifying maintenance.

Description: Double-acting piston pump of positive displacement type is capable of pumping at discharge pressures of 100 psig maximum. It can operate successfully for long periods of time with a lift of up to 10′ of water, and can also develop lifts of 15 to 18′ for short periods of time.

Slurry blow-off protects pump in operation. In the event of diaphragm failure during operation, the slurry blow-off and free space behind the diaphragm prevent the slurry from getting into the drive mechanism. The blow-off vent gives positive indication of diaphragm failure. Optional adjustable stroke permits varying of pump capacity without need of an expensive variable-speed drive.

Pump has rated capacity of 20 gpm, with a motor rating of 2 hp at 100 psi pressure. Units may be equipped with standard or enlarged liquid ends. For quick settling, heavy or crystalline materials, pump can be furnished with bottom discharge valve chambers.

(Type SP duplex diaphragm pump is product of T. Shriver & Co., Inc., 810 Hamilton St., Harrison, N. J.)

Check 1339 opposite last page.

Portable oxygen indicator

Illustrated bulletin of four pages covers principles of operation, uses, and accessories for portable oxygen indicator. Bul 0817-1 — Mine Safety Appliances Co., 201 North Braddock Ave., Pittsburgh 8, Pennsylvania.

Check 1340 opposite last page.

NEW answer to **CORROSION** and **SAFE** fume handling

*TM Owens-Corning Fiberglas Corporation

AMCA Seal does not apply to units with wheels of less than 12" diameter.

Corrosion resistant to moisture laden air, most common inorganic acids, salts, gases, and organic materials. Low maintenance—never requires painting. Motor out of airstream and protected by patented air seal-off. Lightweight, high impact strength. Inherently quiet, sound absorbent. Patented scroll design assures efficiency to 4" S. P. Certified Ratings. Capacities 100-11, 500 CFM.

For full information see your Gallaher representative or write:

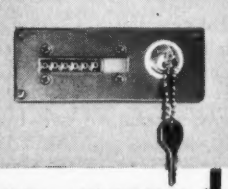
GALLAHER

20 Years of Leadership in Power Roof Exhauster Design

The Gallaher Company 4108 Dodge St. Omaha, Nebraska

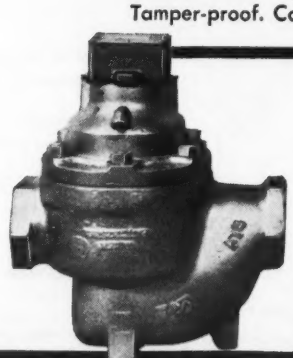
Check 1341 opposite last page

NOW NO MORE HIDDEN METERS
IT'S "UP FRONT"



HENSZEY INDUSTRIAL LIQUID METER

Eliminate missed readings! No more estimates! Bring meter readings out in the open with the new Henszey electrically-operated remote control. Put readings "up front" at eye level. Read one or a dozen meters from just one conveniently located control panel. Reset them instantly with a key. Tamper-proof. Compact. Easily installed.



FAMOUS HENSZEY VORTEX-TYPE METER

A rugged, heavy duty meter adaptable for many liquids. Measures accurately regardless of the liquid's temperature or specific gravity.

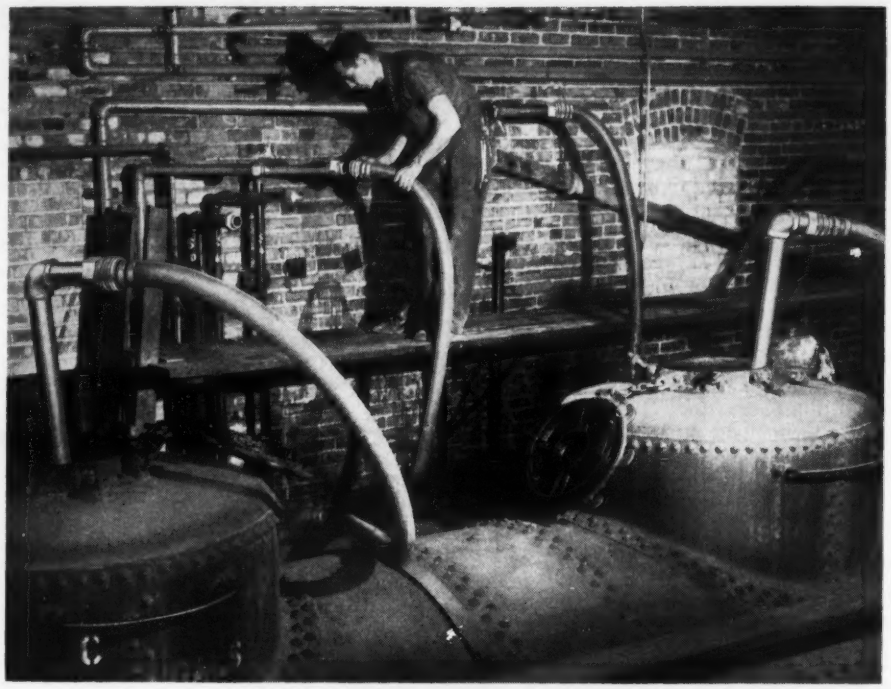
HENSZEY

HENSZEY COMPANY · Dept. P · Watertown, Wis.

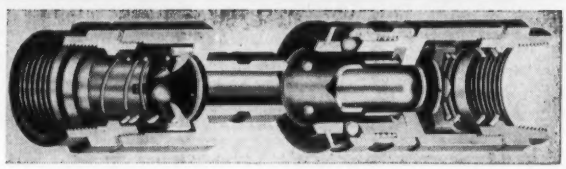
Check 1342 opposite last page

Manpower requirements have been reduced and operations speeded at Minnesota Paints, Inc., since company installed quick-connect couplings for . . .

Safer hose handling in solvent transfer



One man quickly makes or breaks hose connection. Fluid transfer is quicker, safer



Straight-through coupling has Buna-N seal ring. As pressure increases, seal tightens

Problem: Connecting heavy hose between tankcars and storage lines was a hazardous, time-consuming operation at Minnesota Paints, Inc., Fort Wayne, Ind. Hose fastens to a standpipe placed in the tankcar compartment and is then connected to the proper pumping station to transfer to or from storage.

Two men with wrenches made the hose connection. Footing on tankcars, particularly during winter months when cars were coated with ice or snow, was often treacherous. Even two men sometimes found it difficult to make the hookup without spending considerable time and effort.

Each tankcar has three compartments for fluids. Fluids are oils, such as linseed oil, and various solvents used in paint manufacture. Cars are used to transport finished products or intermediate fluids to firm's other plants for distribution.

Solution: Loading dock was equipped with straight-through, quick-seal cou-

NEW GIANT narda SONBLASTER

Generator G-5001
500 watts output

Transducerized Tank NT-5001
Capacity: 10 gallons
Dimensions: 20" L x 11½" W x 10" D

Generator features tank selector and load selector switches on front panel to operate one or two NT-5001 tanks alternately. Other combinations of tanks and submersible transducers available from stock; larger tanks available on special order.

$1325

For mass-production cleaning and high capacity chemical processing!

Here's a new Narda SonBlaster ultrasonic cleaner with tremendous cavitation activity and generating capacity! Featuring full 500 watts output, this SonBlaster is available with a fully transducerized giant 10-gallon capacity tank. In addition, it will operate from six to 10 Model NT-605 high energy submersible transducers, at any one time, in any arrangement in any shape tank you need up to 70-gallon volume.

Install this new Narda SonBlaster, and immediately you'll start chalking up savings over costly solvent, vapor or alkaline degreasing methods! You'll save on chemicals and solvents, cut maintenance and downtime, eliminate expensive installations, save on floor space, and release labor for other work. But perhaps most important, you'll clean faster, cut rejects, and eliminate bottlenecks.

Whether you're interested in mass-production cleaning or degreasing of mechanical, electronic, optical, or horological parts or assemblies ... rapid, quantity cleaning of "hot-lab" apparatus, medical instruments, ceramic materials, electrical components or optical and technical glassware ... or in speeding up metal finishing and chemical processing of all types — you'll find this new SonBlaster will do your work faster, better and cheaper. Write for more details now, and we'll include a free questionnaire to help determine the precise model you need. Address: Dept. CP-20.

Consult with Narda for all your ultrasonic requirements. The SonBlaster catalog line of ultrasonic cleaning equipment ranges from 35 watts to 2.5 KW, and includes transducerized tanks as well as immersible transducers which can be adapted to any size or shape tank you may now be using. If ultrasonics can be applied to help improve your process, Narda will recommend the finest, most dependable equipment available for immediate delivery from stock—and at the lowest price in the industry ($175 up)!

For custom-designed installation and unique electro-acoustic applications, including cleaning, soldering, welding, drilling and nondestructive testing, consult our subsidiary, Alcar Instruments, Inc., at the address below.

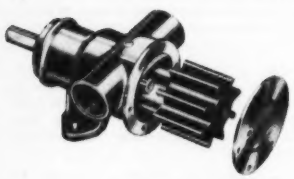
the narda ultrasonics corporation
625 MAIN STREET, WESTBURY, L. I., N. Y.
Subsidiary of The Narda Microwave Corporation

Check 1343 opposite last page

JABSCO SELF-PRIMING
CHEMICAL TRANSFER PUMPS

Jabsco chemical pumps are widely used wherever liquids, semi-solids and slurries are transferred. From the West Virginia Pulp and Paper Company, Luke, Md., comes this factual report: "We find your pumps extremely useful for laboratory and pilot plant work. We have pumped water, caustic soda solutions up to 50%, various other chemical solutions, chalk and pigment slurries of high and low consistencies and pulp slurries up to 3% quite satisfactorily. The self-priming ability of the pumps makes the transferring of liquids from tank to tank a very simple operation as it is only necessary to switch the hose lines around as needed, no connections are needed to the tanks as the hoses are dropped in from the top."

Noel Obenshain, Research Engineer



Whether your pumping requirements are similar to Mr. Obenshain's, or quite different, chances are there's a Jabsco self-priming chemical transfer pump perfectly suited to your requirements. Jabsco chemical pumps are manufactured in stainless steel, plastic, bronze, and cast iron and feature Jabsco's heat and wear resistant neoprene impellers.

Get your copy of Jabsco's chemical resistance chart today. Call your Jabsco distributor (see the Yellow Pages) or write direct to:

JABSCO PUMP COMPANY
2031 North Lincoln St., Burbank, California

Gentlemen: Please send information on Jabsco self-priming chemical transfer pumps and the Jabsco Chemical Resistance Chart.

Name_____
Company_____
Street_____
City_____ Zone____ State_____

Check 1344 opposite last page

plings. Couplings were placed on standpipes, hose ends, and pumping station piping. Buna-N, V-type seals form heart of coupling. Pressure inside line expands circumferential "V" opening. Seal becomes tighter as pressure increases. Coupling nipple seats against side of ring so seal is instantaneous and leak-proof.

Swivel action through 360° prevents hose kinking. Connections can be made or broken with one hand without the use of tools.

Results: One employee can now quickly connect heavy hose to both proper station and to standpipe. Pumping can be started in a matter of seconds due to ease with which connections can be made. Danger from slippery car surfaces is minimized.

Since it is now easy to load and unload one or more compartments at a time, operations are faster, safer, and more efficient. A greater number of tankcars can be handled each day.

(Quick-Seal couplings are product of Titeflex, Inc., Hendee St., Springfield 4, Mass.)

Check 1345 opposite last page.

Small fire extinguisher uses dry chemical, has 4 B:C rating

Uses: For extinguishing electrical, grease and oil, gasoline, paints, or butane-propane fires.

Features: Unit is small, lightweight, easy to operate, and has Underwriters' rating of 4 B:C.

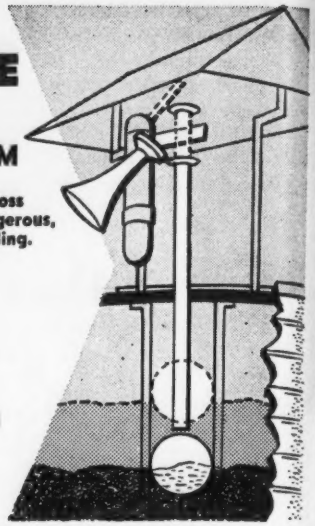
Description: Operation of 3-lb fire extinguisher consists of pulling ring pin and squeezing handles. All parts are corrosion-resistant brass or bronze, and won't rust if left outdoors.

One-piece spun-steel cylinder meets ICC standards. It has been tested to 800-lb pressure with rupture point of 3000 psi.

("Home Size" dry chemical fire extinguisher is product of Safety First Products Corp., Elmsford, N. Y.)

Check 1346 opposite last page.

AVOID SPILLAGE
with FALCON TANK-LEVEL ALARM

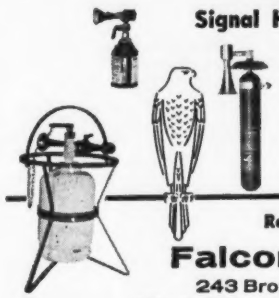


Automatic warning prevents loss of product through often dangerous, always expensive tank overfilling.

- **NON-ELECTRIC**
- **NON-PNEUMATIC**
- **SELF CONTAINED**
- **INEXPENSIVE**

Float activates CO_2-powered horn at predetermined level, instantly sounds alarm.

Signal Horns by Falcon



Portable Falcon signallers ideal for 1,001 industrial applications. Round-the-clock fire protection with U/L approved automatic Falcon fire detectors. Self contained, inexpensive, minimum maintenance.

Representatives in principal cities.

Falcon Alarm Co., Inc.
243 Broad St., Summit, New Jersey

Check 1347 opposite last page

NOW! Stearns Drum Separators with amazing Indox V Magnets

•

Up to 40% stronger than ordinary permanent magnet separators

Again Stearns gives you greater tramp iron removal at lower cost with revolutionary Indox V ceramic magnets. This time it's the new Stearns Drum Separators.

Revolving stainless steel drum carries material over stationary Indox V magnet assembly. Troublesome tramp iron is pulled out and discharged into a separate chute. Ideal for granular materials conveyed through closed chute or spout. Complete range of sizes.

Ask for FREE bulletin No. 1051-P.

STEARNS MAGNETIC PRODUCTS
A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY
635 South 28th Street • Milwaukee 1, Wisconsin

Check 1348 opposite last page

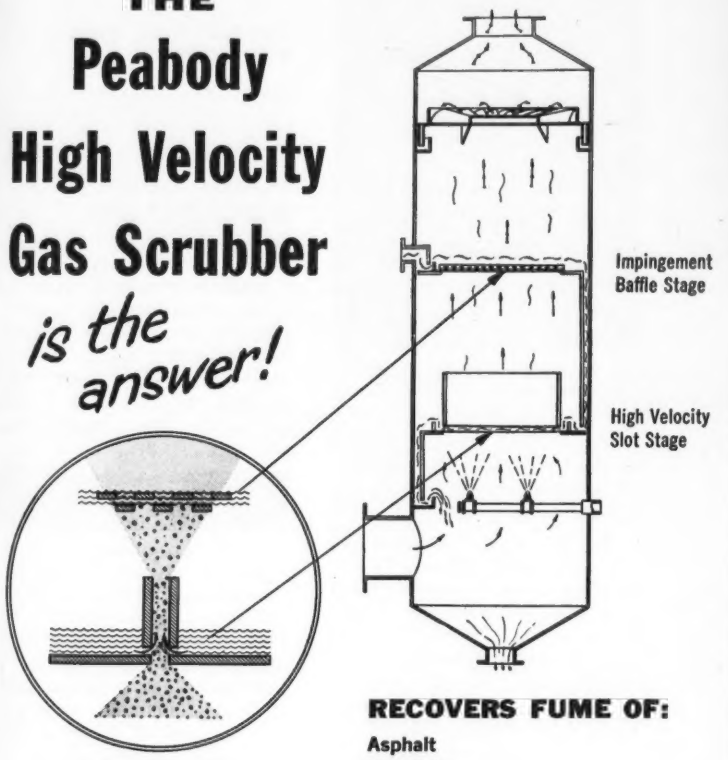
FOR

High Efficiency Removal OF Sub-micron Particles

THE

Peabody High Velocity Gas Scrubber

is the answer!



FEATURES:

- Agglomerates
- Removes fume and larger particulate matter
- Absorbs soluble components

RECOVERS FUME OF:

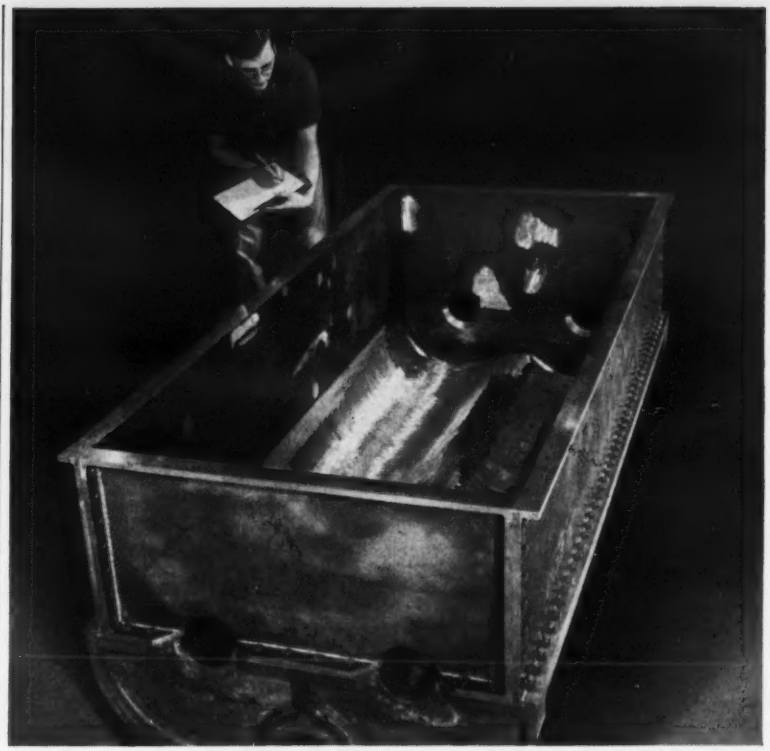
Asphalt
Salt Cake
Boric Oxide
Sodium Oxide
Ammonium Chloride
Blast Furnace Gas
Radioactive Wastes

To remove sub-micron particulate matter, use the Peabody High Velocity Gas Scrubber. Write today for complete information.

PEABODY ENGINEERING CORPORATION
232 MADISON AVENUE, NEW YORK 16, N.Y.
OFFICES IN PRINCIPAL CITIES
PEABODY LIMITED • LONDON, S.W. 1, ENGLAND

8-291

Check 1349 opposite last page



Gunpowder mixing unit consists of two opposed-type screw agitators housed in a one-inch-thick tally bowl shown here. Top portion of the bowl and agitator troughs are fabricated of Ampco Metal plate; bottom ends are sand-cast Ampco Metal.

Practically no wear in 1½ years of mixing explosives!

One of two screw agitators cast of Ampco Metal and then machined.

Mixer is made of strong, tough AMPCO METAL to resist abrasion

The highly abrasive effect of dynamite wears most metals mirror-smooth in a hurry. Yet, in one powder plant — after 1½ years' service — components of this mixing bowl still show the original grinding marks made during fabrication!

The mixer is all Ampco Metal, a high-strength copper-base alloy — even to the weldments. Sand castings and plate of Ampco Metal are welded together with Ampco-Trode weldrod of similar physical and chemical characteristics.

Resistance to abrasion — and to erosion and corrosion — is just part of the story. Because Ampco Metal is also spark-resistant, the hazards of explosives mixing are minimized.

Call in the field engineer and discuss ways *you* can use Ampco Metal profitably. Or write for details. *Ampco Metal, Inc., Dept. 130-J, Milwaukee 46, Wis. West Coast plant: Burbank, Calif. — Southwest plant: Garland (Dallas County), Texas.*

AMPCO®

TS-5

Check 1350 opposite last page

FOOTE BROS. **Motorized Drives**

Duti-Rated LIFETIME GEARING

Gives You More Power Per Dollar

FOOTE BROS.-LOUIS ALLIS

GEARMOTORS

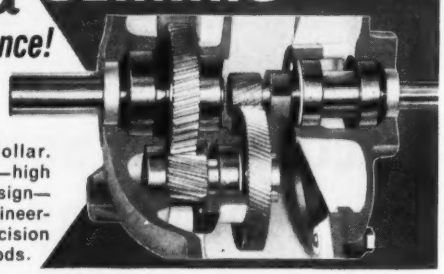
1 to 150 HP...Single, Double, Triple, Quadruple Reductions . . . Output Speeds from 780 to 7.5 RPM

Foote Bros.-Louis Allis Gearmotors are available in over 3500 types and sizes. Foot or flange mountings. Motors can be ordered in any type—open drip-proof, totally enclosed, explosion proof, etc. to meet your requirements.

Duti-Rated GEARING

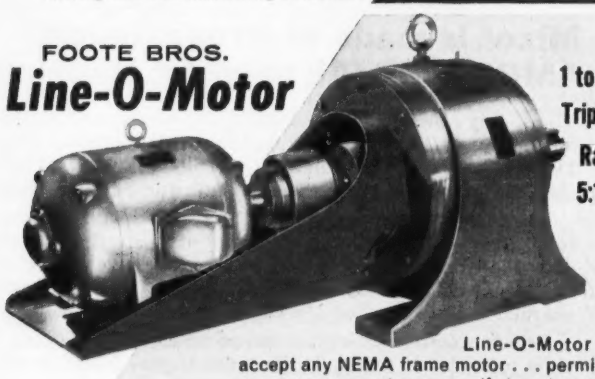
Makes the Difference!

Duti-Rated Gearing is the heart of Foote Bros. Motorized Drives . . . drives that give you more load capacity and wear life per dollar. This is premium quality gearing—high hardness, accurate, balanced design—the product of thousands of engineering and development hours, precision tooling and manufacturing methods.



FOOTE BROS.

Line-O-Motor



1 to 75 HP...Double, Triple Reductions...

Ratios:

5:1 thru 238:1

Line-O-Motor Drives accept any NEMA frame motor . . . permit you to use your own motor or specify type to meet plant standardization. Foot or flange mounted.

Write for CATALOG MRA. It has complete details and selection data on Foote Bros. Motorized Drives.

this trademark stands for the finest industrial gearing made

T. M. REG. U. S. PAT. OFF.

FOOTE BROS. Duti-Rated LIFETIME GEARING

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION

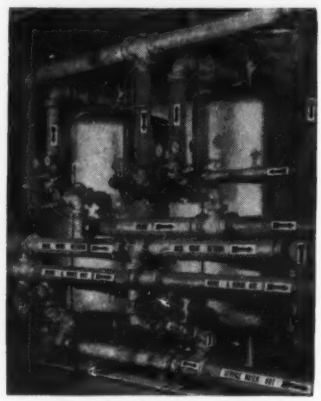
4555 South Western Boulevard Chicago 9, Illinois

Check 1351 opposite last page

Up safety, save time at Allis-Chalmers with pipe markers

Easily applied identification helps eliminate errors

Self-sticking, printed-fabric markers have helped Allis-Chalmers Manufacturing Company, Milwaukee, Wis., to upgrade company's pipe-marking system. Markers cut maintenance time because no painting is necessary.



Example of pipe marking system. Note clarity of pipe identification

Repairs or new installations can be accomplished more quickly when direction of flow and pipe contents are easily determined. There is no chance of delay during emergencies since identification of contents in each line is immediate and certain.

System identifies explosive and non-explosive liquids and gases. Flows include propane, city gas, steam, oxygen, fuel oil, condensate return, drinking water, city water, pond water, and storm and sanitary sewage. Markers withstand temperatures between −300 and +300°F. Silicone-plastic overcoating assures continued readability.

Markers are being installed on all changes of piping and all new pipe installations as they occur in the plant. Because of the vastness of the plant facilities, no attempt is being made to change over all pipe identification at one time. Present color-coding system has been in successful use for more than ten years.

Allis-Chalmers goes further than the ASA Code in this identification of pipe lines by using specific colors for each category of content rather than general classification for explosive and non-explosive content.

Markers have bold English legends printed on impregnated vinyl-cloth backing. Background colors conform to ASA Code No. A-13.

(Pipe markers are a product of W. H. Brady Co., 727 West Glendale Ave., Milwaukee 9, Wisconsin.)

Check 1352 opposite last page.

Increase heat transfer in graphite tubing with internal fins

Internal, helical fins increase inner surface area of ⅞-inch impervious graphite tubing by 2.6 times. Twenty-three fins, each 3/16″ high, provide turbulent flow at right angles to tube's longitudinal axis thereby also increasing heat transfer coefficients.

Low-fin design makes possible reduction in number of tubes required in heat exchangers

Tube makes possible design of heat exchangers with one-half number of tubes in those corrosive services where internal heat transfer coefficient is low and limiting. It is available in 6-, 9-, 12-, 14-, and 16-ft lengths.

(Karbate internal low-fin graphite tube is available from National Carbon Company Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, New York.)

Check 1353 opposite last page.

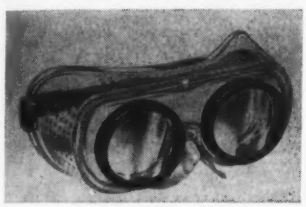
For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Lightweight goggles have soft frame; cut fatigue

Uses: Provide eye protection for welders or chippers.

Features: Lightweight goggles with soft, vinyl plastic frames provide comfort by molding to the face. Wearing fatigue and strain are lessened.

Description: Safety goggles are available in both welder's and chipper's models. Welder's model, has light-proof, indirect ventilators to eliminate harmful light rays and glare,



Soft, vinyl plastic frames of lightweight safety goggles mold to face and cut wearing fatigue and strain

and is fitted with removable rings and filter lenses. In chipper's model, direct ventilation and clear frame are provided. Replaceable rings are fitted with clear, safety hardened or laminated lenses.

Both models are equipped with pliable nose shields for added protection. Frame sizes fit over all prescription glasses with ease.

(Safety goggles are available from Glendale Optical Co., Inc., 600 W. Merrick Rd., Valley Stream, L.I., N. Y.)

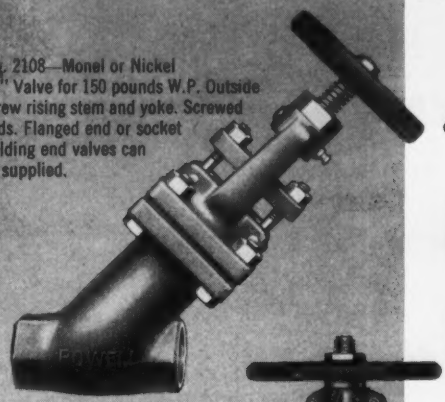
Check 1354 opposite last page.

Cool data

Line of backward-blade fans, designed for use in heating-ventilating and air conditioning systems, power plant installations, and industrial processes are covered in 40-page bulletin. Engineering data, specifications, performance tables, and selection information are included in Bul BB-105 — General Blower Co., Morton Grove, Ill.

Check 1355 opposite last page.

Fig. 2108—Monel or Nickel "Y" Valve for 150 pounds W.P. Outside screw rising stem and yoke. Screwed ends. Flanged end or socket welding end valves can be supplied.



AGAIN AVAILABLE!

POWELL

NICKEL and MONEL* VALVES

Fig. 2453 SG—Large size O.S. & Y. Gate Valve for 150 pounds W.P. Solid wedge disc. Can also be furnished with split wedge disc. Dimensions conform to latest standards.

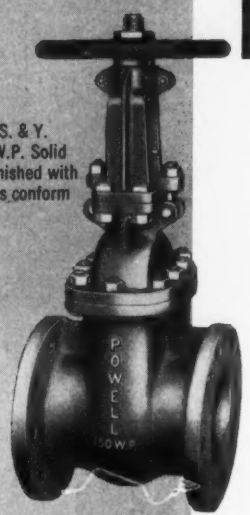
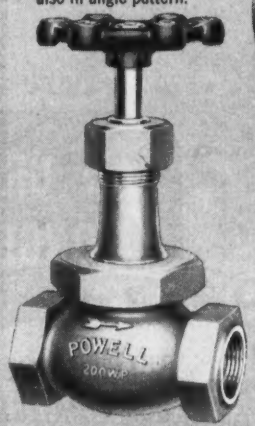


Fig. 1836—Monel Metal
Fig. 1839—Nickel
Small Union Bonnet Globe Valve for 200 pounds W.P. Available with screwed, flanged or welding ends; also in angle pattern.



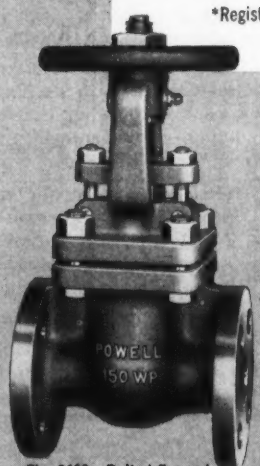
Now that restrictions have been lifted on the manufacture of Nickel and Nickel Alloys, we have produced a wide line of NICKEL and MONEL* METAL VALVES. All are ready for immediate delivery!

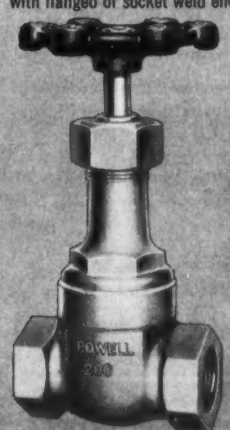
When your flow control requirements call for Nickel or Monel* Metal Valves your local Powell Valve Distributor is the man to see. There's one located in all principal cities. Or write to us for complete information.

THE WM. POWELL COMPANY
Cincinnati 22, Ohio
dependable valves since 1846

*Registered Trade Name of The International Nickel Co.

Fig. 1828—Monel Metal
Fig. 1830—Nickel Inside screw rising stem Gate Valve for 200 pounds W.P. Accurately guided solid wedge disc. Also available with flanged or socket weld ends.





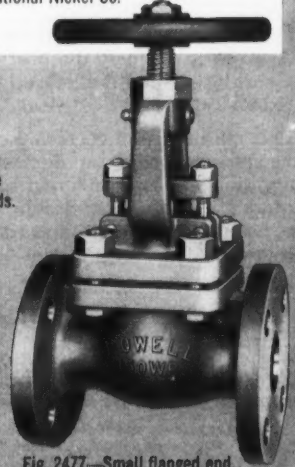


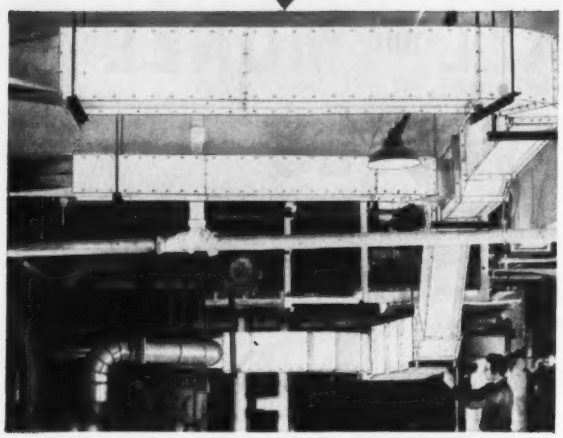
Fig. 1843—Monel Metal. Fig. 1845—Nickel. Small size Check Valve for 200 pounds W.P. Screwed-in cap. Has straightway flow area through valve body when disc is in wide open position. Can also be supplied with flanged or socket weld ends.

Fig. 2493—Bolted flanged bonnet Gate Valve for 150 pounds W.P. Outside screw stem rises through revolving bushing in upper yoke. Interchangeable solid or split wedge discs. Screwed or socket weld end valves also available.

Fig. 2477—Small flanged end, outside screw rising stem and yoke Globe Valve for 150 pounds W.P. Bolted flanged bonnet. Can be furnished with screwed or socket weld ends. Angle Valves available.

Check 1356 opposite last page

Save Money!
ON
CORROSION-RESISTANT
Duct Work



ERVA-DUCT installation conveying corrosive fumes in this processing plant saved an estimated $2,000 as compared with system in previous service.

Erva Duct

of Porcelain Enameled steel

. . . . saves up to half the cost of stainless, PVC and similar protective materials for conveying or exhausting corrosive gases.

This chip-resistant, ceramic-coated duct is fire and explosion proof, unaffected by high temperature, and as easily cleaned or decontaminated as plate glass. Modular design simplifies installation, periodic inspection and re-piping for system changes.

ERVA-DUCT withstands abrasion and most corrosive atmospheres except hydrofluoric acid. Standard components permit assembly of duct systems ranging in cross section from 36 to 576 square inches with any special sizes available as required.

For complete details send prints and application data or request test panels for your own evaluation.

ERVALE
CORPORATION
An ERVITE Affiliate
4000 W. RIDGE ROAD
ERIE, PENNSYLVANIA

Check 1357 opposite last page

Rugged control valves hold desired pressure up to 20 psi

Uses: For pressure regulation and relief in large sealed containers for storage or shipping.

Features: Design provides for automatic pressure regulation calibrated to any desired pressure up to 20 psi.

Lightweight but rugged pressure control valve will maintain any desired pressure up to 20 psi, indefinitely

Unit can withstand rough handling and vibration without affecting its operation.

Description: Lightweight, small-size pressure control valve is corrosion resistant and dirt proof. Valve can be installed easily and requires no tools to operate. Quick access to container is made possible by a quarter turn of valve which releases pressure.

(Pressure control valve is product of Marman Div., Aeroquip Corporation, 11214 Exposition Boulevard, Los Angeles 64, California.)

Check 1358 opposite last page.

NEXT MONTH

At White Sands Proving Ground, New Mexico, the Propellant Branch handles over five million pounds of explosive, corrosive, and/or toxic fuels and oxidizers each year. How the job is done with maximum safety will be outlined next month.

CHECK YOUR SAFETY CANS
for safety's sake
QUANTITY • CONDITION • PROPER USE

JUSTRITE
the complete line of genuine, approved** safety cans...

REMEMBER
5 gal. of gas. explode with the same force as 415 pounds of dynamite!

TODAY'S GREATER USE OF SOLVENTS HAS INCREASED YOUR NEED FOR:

SAFETY CANS: Rugged, super-strong for greater safety, longer life in handling flammable liquids. 7 sizes: 1 pt. to 5 gal.

OILY WASTE CANS: Prevent spontaneous combustion fires. Designed for max. air circulation. 5 sizes: 6 gal. to 40 gal.

BENCH CANS: New design! Portable parts basket speeds handling small parts, keeps hands dry. Use as ½-gal. or gallon unit.

PLUNGER CANS: Dispense flammable liquids safely! Adjust to control amount used. Cleans easily. 3 sizes: Qt., ½-gal., or gallon.

**"Underwriters' Labeled, Factory Mutuals Approved

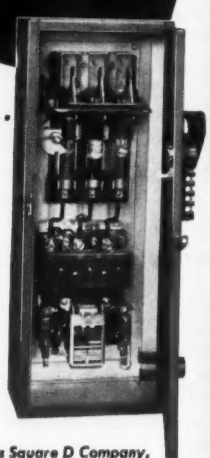
JUSTRITE MFG. CO.
Chicago 14, Ill.
Dept. S-98

Your Dependable Local Industrial Distributor has:
JUSTRITE

Check 1359 opposite last page

for GREATER SAFETY & LONGER STARTER LIFE

THIS SQUARE D
COMBINATION STARTER...



• You save time and money when you install one device instead of two. You save mounting space, too. And you have a neater, more compact installation.

Square D's Switch gives you no less than eight design features which provide plus performance and operator safety.

Square D's Starter design provides quicker, easier maintenance and exceptionally long life.

Write for Bulletin 8538. Address Square D Company, 4041 N. Richards Street, Milwaukee 12, Wisconsin

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

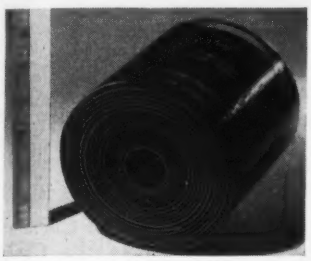
SQUARE D COMPANY

Check 1360 opposite last page

Plastic tubes, rods attain compressive strengths of 76,000 psi

Uses: For chemical, electrical, and mechanical rod and tube applications.

Features: Axial compressive strengths of 76,000 psi are attained, and tubes have been produced to withstand 10,000 psi external pressure at 300°F.



Manufacturer produces rods and tubes of reinforced plastic in any wall thickness

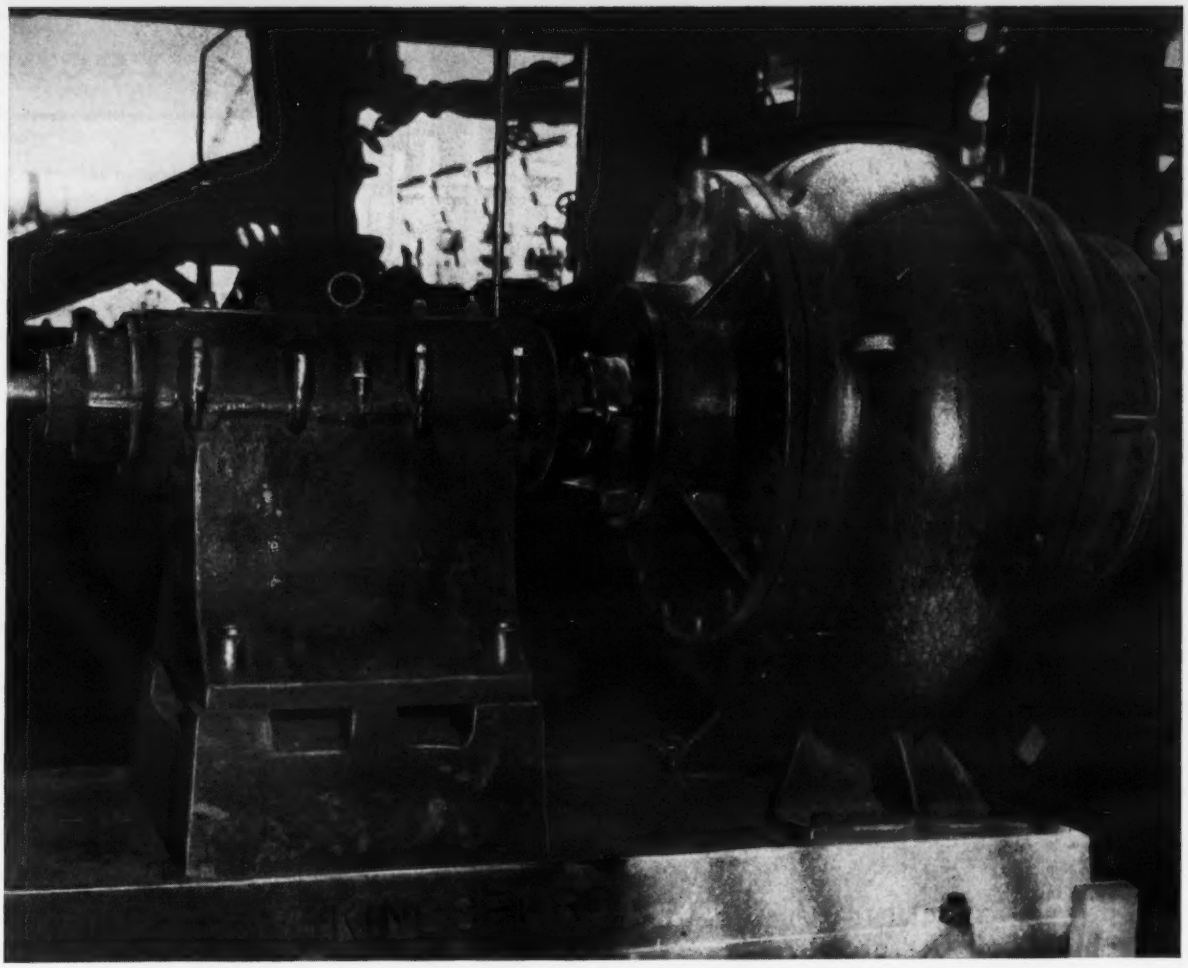
Description: Large-diameter tubes of reinforced plastic are available with diameters up to 8″, in any wall thickness. According to the manufacturer, glass content up to 80% by weight is attained with no evidence of resin-starved areas.

Resins include epoxies, polyesters, phenolics, and diallyl phthlate. Reinforcements may be of glass, cotton, Dacron, Nylon, Orlon, or paper.

(Plastic rods and tubes are available from Plasteco, Inc., PO Box 9123, Houston, Texas.)

Check 1361 opposite last page.

"Sometimes I think we're too far ahead of the current market."



ONE OF TRIPLETS. Three pumps with Inco-cast Nickel housings push cell liquor through heat exchangers within triple-effect evaporators at a new caustic-chlorine plant. Inco-cast Nickel provides high resistance to caustic embrittlement...brine corrosion...abrasion from solids.

How would you handle 46% caustic, 12% salt slurry?

This pump circulates cell liquor and caustic soda through heat exchangers in triple-effect evaporators.

Caustic concentrations run as high as 46% . . . salt slurry concentrations up to 12%.

Nickel was specified for the housings because it resists attack from brine corrosion, caustic embrittlement, and abrasion from solids.

But these excellent properties are of little value unless they are incorporated in high quality castings. That's why Kingsford, the pump fabricator, comes to Inco's own foundry for Nickel housings.

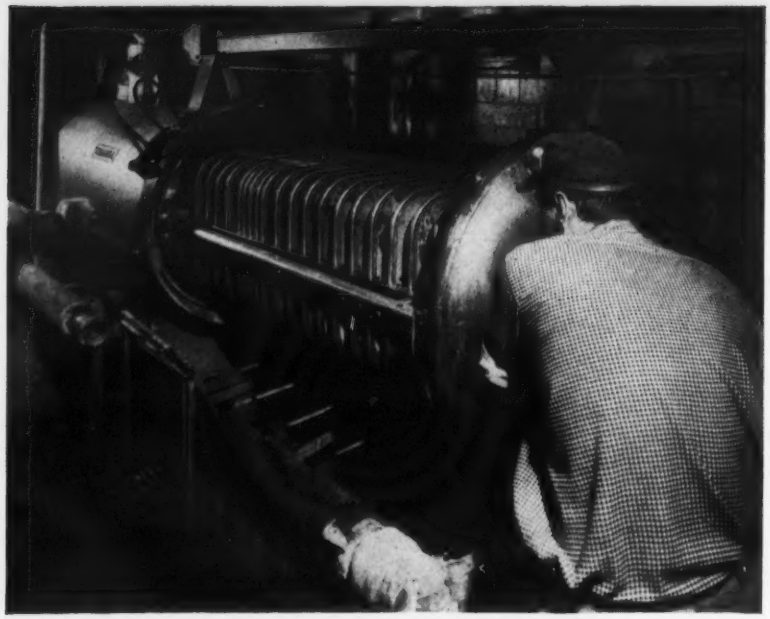
To get the most out of Nickel and high nickel alloy castings, have them Inco-Cast. This is the best way to make sure your castings will have all of the properties that make Nickel superior to any other commercially available metal for handling caustics.

So, when you're up against destructive service conditions, be sure to investigate the advantages of Inco-cast Nickel and other Inco-cast Alloys. You'll find some good, usable information in our Data Folder, *Engineering Properties of Cast Nickel.* Write for a copy.

THE INTERNATIONAL NICKEL COMPANY, INC.
Bayonne Works
15 Oak Street — Bayonne, N. J.

INCO-CAST PRODUCTS

Check 1362 opposite last page



More time on stream!

FASTER CLEANING . . . Some users report as much as 50% reduction in downtime with Niagara Filters. This unit, in sizes up to 2000 sq. ft. of filter area and 250 cu. ft. of cake capacity, can be cleaned by ONE MAN in a matter of MINUTES.

LESS MAINTENANCE . . . Niagara Filter users gain here, too, because of this filter's simple, efficient design. All Niagara Filters are designed and built in strict accordance with the A.S.M.E. Code. For details as they apply to your processing problem, see the Chemical Engineering Catalog or write today describing your requirements.

Niagara® FILTERS

A DIVISION OF

American Machine and Metals, Inc.

Dept. CPN-958, EAST MOLINE, ILLINOIS

(Niagara Filters Europe: Kwakelpad 28, Alkmaar, Holland)

Specialists in Liquid-Solids Separation

Check 1363 opposite last page

recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Chemical Engineering In The Coal Industry

Reviewed by
REYMOND Q. SHOTTS
Professor of Fuel Engineering
University of Alabama

"Chemical Engineering in the Coal Industry" was the subject of an international conference held by the National Coal Board of Great Britain at Stoke Orchard, Cheltenham, in June 1956. This 141-page book contains all the papers presented at this conference, along with oral and written discussion which in many cases are more interesting than the papers themselves.

Two treatises in this volume are concerned with oxidation of coal and are of considerable theoretical as well as industrial interest. Two deal with briquetting of coal and briquette carbonization, two with fluidized oxidation and carbonization processes, and two with tars. One of the papers on tars concerns those produced by a fluidization. method.

From this reviewer's standpoint, the symposium would have been more nearly complete had it included processes such as hydrogenation or solvent extraction, which are not primarily thermal. It is true that such methods are not yet in wide industrial use, but surely there must be some developments of interest in the field of synthetic liquid fuels. As a result, the contents of the book are much more restrictive than is its broad title.

The absence of papers on relatively nonthermal processes, and the content of those published, seem to support the conclusion of J. Bronowski, Director of the National Coal Board Research Establishment. In the closing address he stated that the advances of recent years are ahead of their application and that the treatment of coal could be revolutionized by putting into practice now the scientific findings which are well-founded and known.

As a whole the papers and discussions are of high quality and show that advances along essentially parallel lines are being made in several countries.

To obtain "Review of Chemical Engineering in the Coal Industry" remit $8.50 *direct to Pergamon Press Inc., 122 East 55th St., New York 22, New York.*

Check 1364 opposite last page.

Chemical Process Economics

This book provides a working tool to the chemical engineer to assist him in applying technical information to the economic design and operation of chemical processing plants.

Written by Dr. John Happel, professor and chairman, Department of Chemical Engineering, New York University, the 291-page book contains information that forms major part of plant design course given at NYU.

Its eight chapters discuss such topics as: principles of economic balance; expanded economic balance equation; special mathematical techniques; notes on cost estimation; risk, return rate, and investment recovery; overall considerations in project analysis; process plant components; and social values in engineering economy.

Each chapter contains group of practical problems. These involve selection of new equipment, design of plant components, operation of plants, etc. Basic mathemati-

cal relationships are carefully developed to aid in the solution of problems. Sample problems are worked out in detail.

Book has four appendixes. Special section is devoted to "rules of thumb" for practical design of chemical plants. These rules are based on actual experience of engineering firms. They permit reader to obtain quick, approximate answers when there is not enough information available to justify detailed calculations.

To obtain "Chemical Process Economics", remit $8.50 direct to John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, New York.

Check 1365 opposite last page.

Biological Treatment of Sewage and Industrial Wastes — Vol 2

This book consists of a series of 28 papers presented at conference on anaerobic digestion and solids-liquid separation held at Manhattan College in April 1957. The volume is arranged in three parts: 1) Anaerobic Treatment, 2) Sedimentation and Flotation, and 3) Vacuum Filtration and Sludge Conditioning.

Book has a total of 330 pages and includes both author and subject indexes. Chapters are adequately illustrated with graphs, charts, tables, or drawings. Photographs are also included. References are listed at end of each paper.

Chapter dealing with historical development of anaerobic digestion includes interesting facts on origin of cesspools and septic tanks. This is followed by two papers that discuss biochemistry and biochemical changes occurring in anaerobic process.

Also included are chapters dealing with processing of pea blancher, packing house, pulp and paper, and other industrial and domestic wastes.

The volume is recommended as an excellent reference for chemists, industrial and sanitary engineers, municipal officials, and all those interested in waste treatment problems and methods of biological waste treatment.

The book is edited by Brother Joseph McCabe, F.S.C. and W. W. Eckenfelder, Jr., Manhattan College.

To obtain "Biological Treatment of Sewage and Industrial Wastes — Volume 2", remit $11.50 direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, New York.

Purity Control By Thermal Analysis

Reviewed by
SAMUEL P. MASSIE
Professor of Chemistry
Fisk University

This 180-page book, edited by W. M. Smit, is a report of the International Symposium on Purity Control by Thermal Analysis, held in Amsterdam in 1957. It presents sixteen invited papers by international experts on all phases of this extremely sensitive method of purity control, growing in importance and interest.

Papers reveal new techniques and discuss methods for studying variations in levels of purity and temperature. Full apparatus descriptions are given.

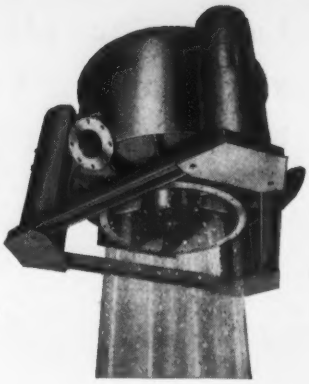
All but two papers are in English, but summaries of each paper are given in three languages (English, French and German). Each paper lists excellent references. Eight-page digest of the various discussions is a valuable section, as is the well-prepared index.

Book should be of much value to all who are dealing with product control of fine chemicals and pharmaceutical preparations, and investigations of polymers. However, those interested in pure substances from a strictly scientific viewpoint will also find the book of use.

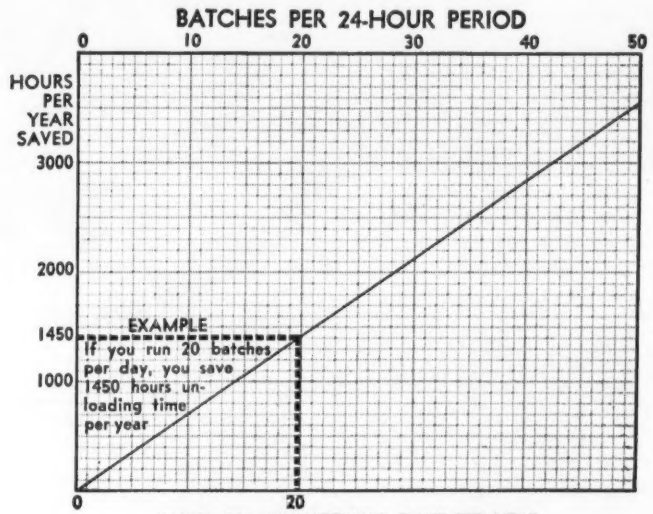
To obtain "Purity Control by Thermal Analysis" remit $4.75 direct to D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, New Jersey.

Check 1366 opposite last page.

PREDICT the centrifuging hours you save in a year



This most revealing chart quickly shows how much unloading time you can actually save, with Batch-Master's® rapid bottom discharge and hydraulic unloader. The chart is based on Batch-Master's unloading time (30 seconds average) . . . as compared with that of a manually unloaded batch centrifugal (15 minutes or more). If the chart gives you a jolt, investigate Batch-Master.



BASED ON 300 WORKING DAYS PER YEAR

FOR MORE COMPLETE DATA, SEE TOLHURST'S SECTION IN CHEMICAL ENGINEERING CATALOG or write

MAIL COUPON TODAY

Tolhurst® CENTRIFUGALS

A DIVISION OF

American Machine and Metals, Inc.

Specialists in liquid-solids separation

Dept. CPT-958, EAST MOLINE, ILLINOIS

Send me your catalog on the time-saving Batch-Master Centrifugal.

NAME AND TITLE _____

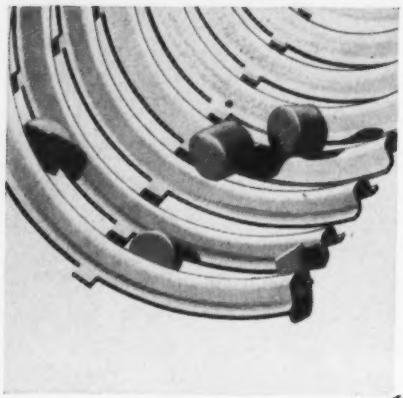
COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Check 1367 opposite last page

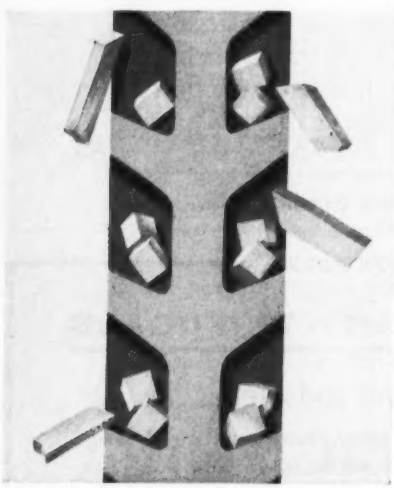
Lately more plastics materials are being sized and separated by Simon-Carter machines



CARTER GRADERS PERFORM THICKNESS, WIDTH SEPARATIONS

For sizing or separating free-flowing granular materials by *thickness*, Carter Precision Graders use revolving cylinders with *slotted perforations at the bottom of grooves*. Saddles between these grooves upedge the materials presenting them to the slots in an edgewise position. The thinner pieces pass through and the thicker pieces pass over and are conveyed to the end of the machine.

For *width* sizing or separating the Precision Graders use revolving cylinders with *round recessed perforations*. The recess causes the materials to be presented to the round perforations in an upended position. Narrow pieces pass through and wider pieces pass over for discharge at the end of the cylinder.



CARTER SEPARATORS ASSURE POSITIVE LENGTH SEPARATION

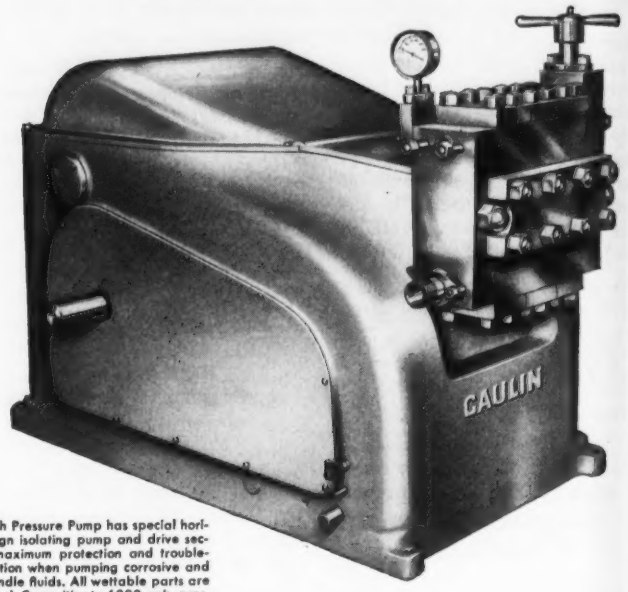
Carter Disc Separators contain a series of discs mounted on a revolving horizontal shaft. Each disc has hundreds of undercut pockets which select or reject plastics or similar materials according to *length*. As the discs revolve through a mixture of materials, the pockets lift out the shorter pieces. The longer pieces, too long to be held in the pockets as they rise, drop away from the discs.

Write today for complete information and descriptive folders on Simon-Carter machines.

SIMON-CARTER CO.
677 Nineteenth Ave. N. E. • Minneapolis 18, Minn.
Successor to Hart-Carter Co., Minneapolis Division

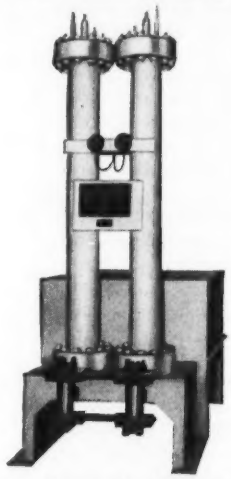
Check 1368 opposite last page

PUMP AND CONTROL LIQUIDS, ABRASIVE SLURRIES and VISCOUS FLUIDS WITH GAULIN TRIPLEX AND HX PUMPS



Triplex High Pressure Pump has special horizontal design isolating pump and drive sections, for maximum protection and trouble-free operation when pumping corrosive and hard-to-handle fluids. All wettable parts are stainless steel. Capacities to 6000 gph, pressure to 12,000 psi, temperatures from −90°F to +550°F.

The Gaulin Triplex High Pressure Pump is a rugged, heavy-duty machine for large volume pumping of all types of fluids.



Applications include Spray Drying, Metering, Transfer, Injection, Testing and Hydraulic Pumping. There are over 100 different models available to handle every type of product efficiently and economically. These include sanitary, corrosive, abrasive, viscous and volatile.

The Gaulin HX — Hydraulic Pressure Exchange Pump is a high pressure, high capacity pump specially designed for handling extremely abrasive and corrosive muds, slurries and solutions. It features uniform discharge, slow cycle operation and elimination of all plungers and packing. Handles pressure to 2000 psi, capacities to 120 gpm. Higher capacities on special order. No moving parts are in contact with the product.

Send for GTA Technical Data . . . Complete specifications and technical information contained in GTA† Bulletins. Ask for P-55 on Triplex Pumps and HX-57 on Pressure Exchange Pumps; or request experienced Gaulin Technical Assistance to answer your application.

†Gaulin Technical Assistance.

Write for your set of GTA Bulletins

Gaulin TRADE MARK
MANTON Gaulin MANUFACTURING CO., INC. EVERETT, MASS.

Manton-Gaulin Manufacturing Co., Inc.
55 Garden Street, Everett 49, Mass.

World's largest manufacturer of stainless steel reciprocating, positive displacement, pressure exchange pumps, dispersers, homogenizers and colloid mills.

Check 1369 opposite last page

Tracer Applications For The Study Of Organic Reactions

Reviewed by
DR. SAMUEL P. MASSIE
Professor of Chemistry
Fisk University

In a book primarily written for the organic chemist whose problem is an organic reaction rather than the use of an isotope, John G. Burr, Jr., fills an important need in the chemical literature in his lithoprinted 291-pg volume.

Availability of isotopes has opened widespread application of this powerful tool. These isotopes find special value in the elucidation of mechanisms and kinetic studies. The author very excellently brings the large volume of studies together in 13 chapters.

Following an interesting introduction of 12 pages are five 20-page chapters on isotopic exchange reactions, proton transfer and nucleophilic displacements in non-aromatic substances, exchange reactions in aromatic systems, free radicals, and carbonium ion processes.

These are followed by chapters on specific mechanisms of molecular rearrangements, reactions of the carbon-oxygen bond, oxidation of aliphatic molecules, polymerization reactions, structure of molecules and stable intermediates, and a miscellany collection which includes rearrangements whose mechanisms are not known. Each chapter has literature references at its end.

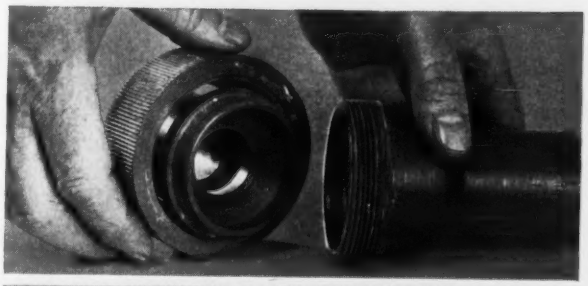
The literature is reviewed completely up to 1952. Author had planned to bring the material up to date, but the increasingly large number of articles made this impossible. However, in a special appendix of 12 pages are listed articles for 1953 and 1954. There are also excellent appendices on books and reviews on tracer applications.

To obtain "Tracer Applications for the Study of Organic Reactions" remit $7.50 direct to Interscience Publishers, Inc., 250 Fifth Ave., New York, N. Y.

Check 1370 opposite last page.

UPVC PIPING NEWS

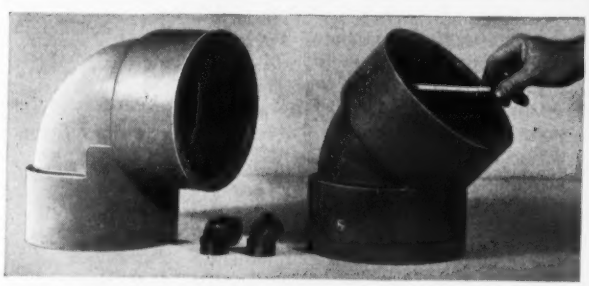
PUBLISHED BY TUBE TURNS PLASTICS, INC. • LOUISVILLE 1, KENTUCKY



EVIDENCE OF UPVC QUALITY. The **ttp** lift check valve shown at the top had operated 15 million cycles when removed for inspection. It carried a 10-15% sulfuric acid solution with sand in suspension. Where metal valves lasted about 9 months, this UPVC valve shows no sign of wear after 13 months.

The lower illustration shows a disassembled **ttp** plug valve after two years' operation *in throttling position*, carrying salt water plus sand. This UPVC product shows no deterioration due to abrasion under this severe service.

To guard against cheap substitute PVC materials, insist on the **ttp** brand. These products are made from *unplasticized* PVC!



NOW 6-INCH. You can now fight corrosion with 6-inch UPVC piping, installed at minimum cost, with **ttp** fittings and flanges. These new products are available in schedule 80, socket type with female end for solvent cementing—or male end for flanged connections, and also victaulic grooved ends.

TO CUT COSTS . . . You can save money two big ways with UPVC piping: (1) Lower first cost than other corrosion resisting materials; (2) lower maintenance costs. Full details, plus valuable application and installation data are given in Catalog 119.

THE COMPLETE LINE of **ttp** products is available quickly from your nearby **ttp** distributor. His stock includes fittings, flanges, valves, solvent cement, thread lubricant. And he can help you on installation problems. Above: At C. A. Roberts Company, Indianapolis, Indiana.

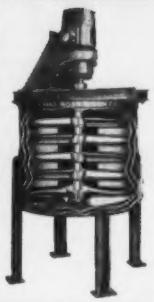
TUBE TURNS PLASTICS, INC.

AN AFFILIATE OF CHEMETRON CORPORATION
Dept. CP-9 2929 Magazine Street • Louisville 11, Kentucky

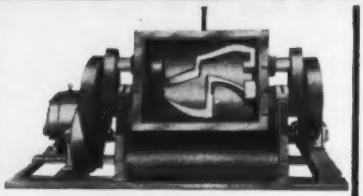
Check 1371 opposite last page

Ross CHEMICAL PROCESSING MACHINERY

gives better results in less time!

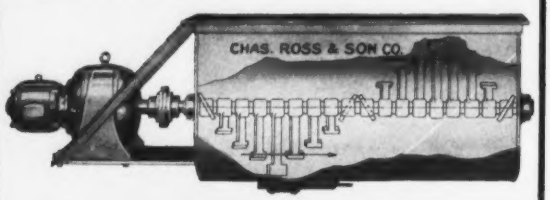


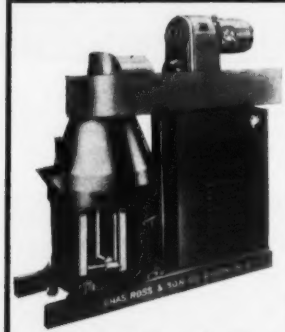
Rubber Cement Mixers
100 - 1000 Gal. sizes



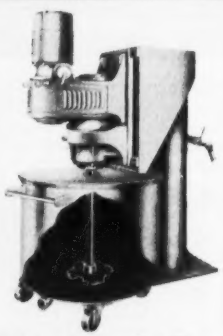
Heavy Duty Double Arm Kneaders
1 pint - 150 Gal. sizes

Rubber Reclaiming Mixers
100 - 1000 Gal. sizes





Double Planetary Change Can Mixers
1 - 150 Gal. sizes

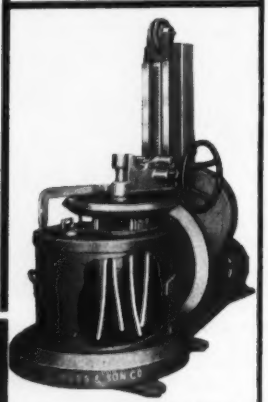


High Speed Change Tank Mixers
80 - 250 Gal. sizes

Heavy Duty Paste Mixers
25-1000 Gal. sizes

Almost a century of furnishing Heavy Duty dependable equipment to the chemical industry.

Write for Complete information!



Heavy Duty Change Can Mixers
8 - 60 Gal. sizes

CHARLES ROSS & SON COMPANY, INC.
Dept. CP 150 Classon Ave., Brooklyn 5, N.Y.

Check 1372 opposite last page

RECENT BOOKS

Pentaerythritols

Authors E. Berlow, R. Barth, and J. Snow of Heyden Newport Chemical Corp. have compiled a comprehensive 316-page monograph on the pentaerythritols, those polyhydric alcohols used mostly as raw materials to make alkyd resins for surface coatings, but also finding application in plastics, insecticides, drying oils, explosives, and pharmaceuticals.

Preparation, properties, and the many reactions are covered in detail and thoroughly documented with hundreds of references.

To obtain "The Pentaerythritols" remit $10 direct to Reinhold Publishing Corp., 430 Park Avenue, New York 22, New York.

Free Radicals In Solution

Reviewed by

DR. LEONARD N. DEVONSHIRE
University of Alabama

An authoritative survey of free radicals in solution is presented in 643-page well-documented volume by Cheves Walling. After a brief historical introduction, properties of free radicals are discussed in terms of measurable and theoretical parameters. Chapter 2 presents the thermodynamic and kinetic approach to study of free radical reactions.

Detailed discussions of polymerization, addition, substitution, autoxidation, thermal cleavage, photochemical, and high-energy-radiation-induced types of reactions are presented in chapters 3-11. Effects of structure on reactivity are accounted for from a unified point of view in terms of resonance, steric, and polar effects. Comprehensive author and subject indexes complete the book.

Although major emphasis is on organic free radical chemistry, inorganic topics are not neglected. The applications of physical chemistry and instrumentation make this

Would you like to receive CHEMICAL PROCESSING personally?

It will be sent to you without charge or obligation . . .

. . . if you qualify

. . . if you request it

If you are responsible for processing operations in an administrative capacity as plant superintendent, chemical engineer, chemist, engineer or equivalent responsibility . . . in a plant of substantial operations* where chemical processing is an important factor . . . CHEMICAL PROCESSING will be sent to you without charge or obligation if you request it. Use form below. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

*"Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

CHEMICAL PROCESSING
111 EAST DELAWARE PLACE
CHICAGO 11, ILLINOIS

Please send me CHEMICAL PROCESSING without charge or obligation

Name .....

Title .....

Company .....

Rating of Company .....

Street .....

City ..... Zone .....

State .....

Main Products .....

treatment of general interest to all chemists.

Professor Walling demonstrates his talent for organization and clear scientific writing in such a manner that this single-volume presentation should become a standard reference.

To obtain "Free Radicals in Solution" remit $14.50 direct to John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y.

Check 1373 opposite last page.

Polyurethanes

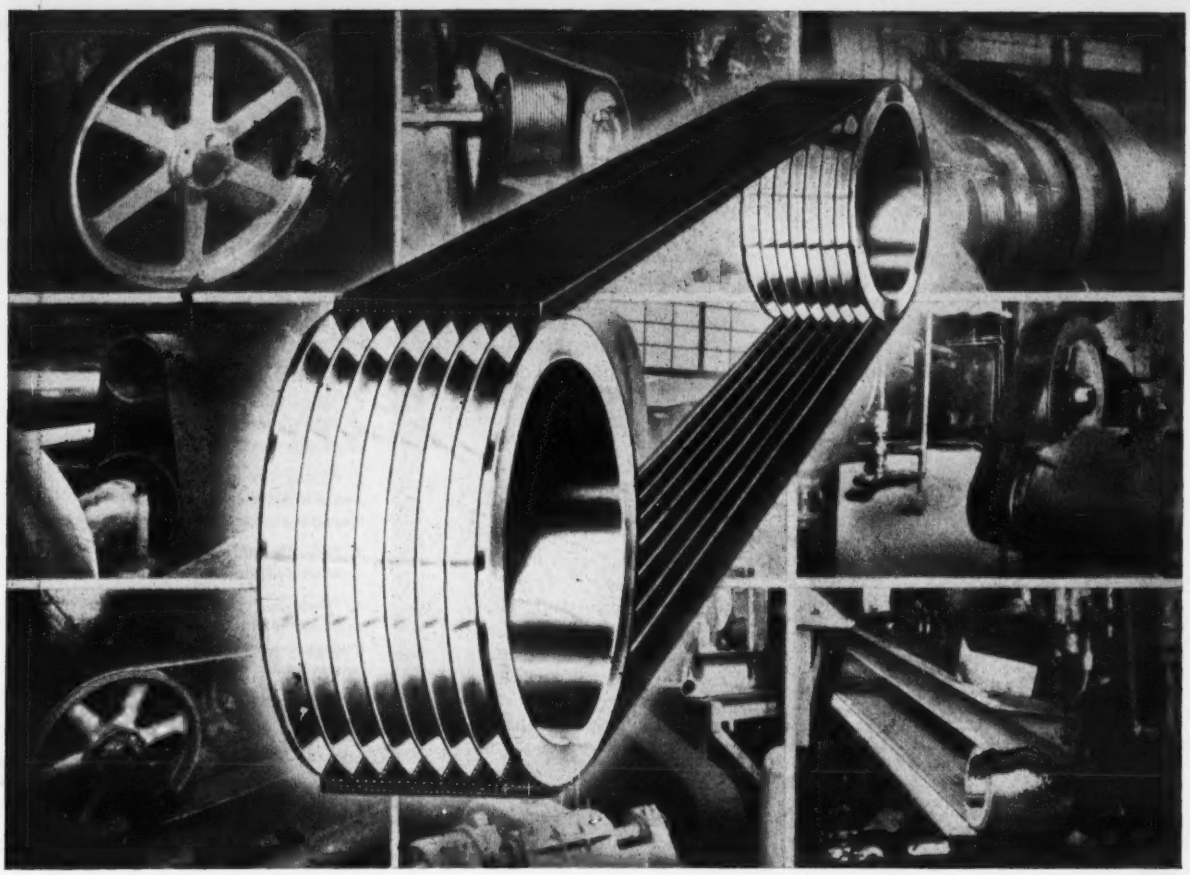
This 138-page, digest-size volume discusses the uses and possibilities of the rapidly expanding field of polyurethanes.

Besides the chemistry of these compounds, applications in foams, rubbers, adhesives, coatings, and textiles are covered in detail. This volume is devoted mainly to applications.

The author is Bernard A. Dombrow, Director of laboratories, Plastics Division of Nopco Chemical Company.

To obtain "Polyurethanes" remit $4.50 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.

"You're out of item 19806 — may I ship you some?"



R/M *Poly-V*® Drive Delivers More Power in Less Space

...*"More Use for your ~~per~~ Dollar"*

R/M's patented new drive design is the reason. R/M Poly-V Drive employs a *single*, endless, parallel V-ribbed belt running on sheaves designed to mate precisely with the belt ribs. Flat belt strength and simplicity *plus* the high V-groove grip of V-belts adds up to *twice* the tractive surface of ordinary multiple V-belts. It's proved in actual performance on drive after drive, to deliver up to 50% *more* power in the *same* space as a multiple-belt drive . . . *equal* power in as little as ⅔ the space! Other features are equally important:

- *No* Belt "Matching" Problems . . . Reduced Downtime Costs
- Uniform Tension and Constant Speed Ratios—*No* Load to *Full* Load!
- Smoother, *Cooler* Running . . . Oil Proof, Non Spark, Heat Resistant
- *Less* Shaft Overhang . . . *Less* Drive Weight
- *Two* Belt Cross Sections **Meet** *Every* Heavy Duty Power Transmission Requirement

Greater power delivery and dependability for *every* drive dollar begins when you specify R/M Poly-V* Drive. R/M engineers who developed it will assist you in determining the best installation for your application. Contact your R/M representative . . . or write for Poly-V Drive Bulletin #6638.

**Poly-V is a registered Raybestos-Manhattan trademark.*

RM-830

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 1374 opposite last page

ACCURATE and DEPENDABLE

INFILCO

Chemical Feeders

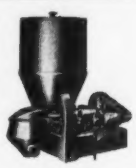
FOR PROCESSING...
TREATING....
MATERIALS ACCOUNTING...

DRY-FREE FLOWING

INFILCO type E feeder is specially designed for chemical and food processing. Responds to 1% linear adjustment. Holds feed rate accurately over long periods without supervision. Requires minimum maintenance. Feed rates range from .04 to 8000 lbs./hr.

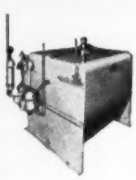
DRY-COMPACTED

INFILCO type D feeder utilizes an adjustable knife to "cut" compacted dry chemicals and other solids from revolving table. Feed rates range from .16 to 1840 lbs./hr.



SLURRY

INFILCO Mixer and Feeder delivers uniform solution or suspension. Vertical mixing maintains uniform slurry. Accuracy of chemical content held to 1.5%. Holding capacities from 40 to 3,000 gals. with feed rate range up to 6 gpm.



SOLUTION

Pneumatically actuated NEUSOL® feeder handles one or two different solutions at individually controlled rates. Duplex feeder ranges .03 gph minimum (using one pump) to 20 gph maximum (using both pumps). No metal parts exposed to solutions.

PROPORTIONING CONTROLS regulated by time, pH or flow are available for all INFILCO feeders.

INFILCO

INFILCO INCORPORATED
Dept. I.S. P.O. Box 5033 TUCSON ARIZONA

Check 1375 opposite last page

RECENT BOOKS

Quantitative Inorganic Analysis

First published in 1944 in France, this book is a translation of the completely revised 1955 edition of Professor Charlot's noteworthy textbook on analytical chemistry. Objective of the 691-page volume is to give as general a survey as possible of the methods of analysis presently used in inorganic quantitative determinations.

The first part of the book deals with various means available to the chemist for making determinations, and for studying processes in solution. The different types of reactions are discussed, along with the general concepts associated with them; thus presenting the theoretical background of the more important methods of classical, instrumental, and physical analysis. Ample references supplement the text.

The applied section of the book, which discusses almost all the elements in detail, would in itself be a useful compendium of analytical information.

The book is a large one — for the expansion of analytical chemistry in recent years has been great.

Written by G. Charlot and D. Bezier, the work has been translated by R. D. Murray.

To obtain "Quantitative Inorganic Analysis", remit $15.00 *direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y.*

Check 1376 opposite last page.

Catalysis —Vol V

Reviewed by
SAMUEL P. MASSIE
Professor of Chemistry
Fisk University

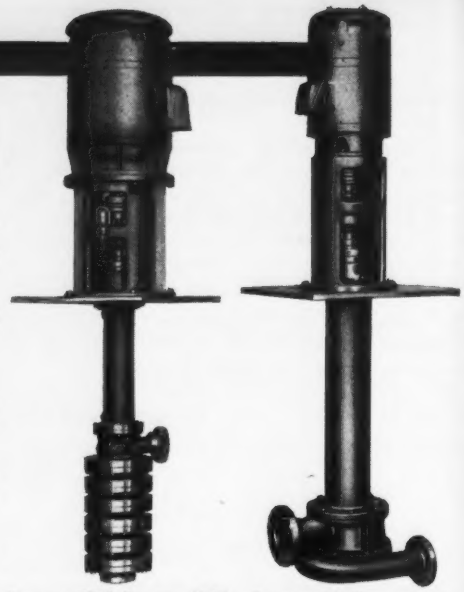
This well-written book of 542 pages, under the able editorship of Paul H. Emmett with nine contributors, continues the excellent presentation of catalysis manifested in the earlier four volumes.

Third in a series on cata-

PUMPS
for liquid oxygen, nitrogen & other liquefied gases

FEATURES:

1. Vertical top suction to prevent gas binding when NPSH drops below safe level.
2. Packing box never comes in contact with liquid, only with gas blanket in pipe column.
3. Packing box fitted with special mechanical seal.
4. Meticulous care in design and material selection eliminates troubles due to expansion differences and prevents galling.



Lawrence High Pressure Multi-Stage Pump for Liquid Oxygen

Lawrence Medium and Low Pressure Pump for Liquid Oxygen

LAWRENCE PUMPS, INC.
371 Market Street, Lawrence, Mass.

Write for bulletin 203-7

Check 1377 opposite last page

Ask for Bulletin 27

Wire Mesh Products Cut engineering and production costs with Jelliff's facilities for precision-forming special filters and strainers in any quantity.

THE C. O. JELLIFF MANUFACTURING CORPORATION
SOUTHPORT, CONNECTICUT

SERVING INDUSTRY FOR 78 YEARS

Check 1378 opposite last page

lytic hydrogenation, this volume includes examples of all types of hydrogenation. First three chapters, comprising 175 pages, are concerned with catalytic reactions of carbon monoxide. Chapter 1 deals with catalytic reactions of carbon monoxide with a variety of agents, and proposed mechanisms; Chapter 2 deals with reactions of olefins, carbon monoxide, and hydrogen to form "oxo" compounds; Chapter 3 is devoted to direct catalytic synthesis of higher alcohols from carbon monoxide and hydrogen.

Chapter 4 (82 pages) presents the enormous work on catalytic hydrogenation of aromatic hydrocarbons; a fifth chapter of 148 pages relates and critically analyzes tracer or radioactive work done in studying mechanisms of catalytic hydrogenation. Final chapter of 122 pages is an authoritative summary of recent work on catalytic hydrocracking and hydrodesulfurization of petroleum fractions.

Each chapter is well-written by authorities in their respective fields, so that much late and authoritative material is presented. For example, Dr. Wender of the Bureau of Mines included considerable unpublished work on the "oxo" reaction.

Although book is primarily written for industrial chemists and chemical engineers, academic chemists will find it of practical value and quite interesting theoretically. Well-indexed, both as to author and subject, this volume is a valuable addition to our knowledge in an important field and leads one to look forward with enthusiasm to forthcoming issues.

To obtain "Catalysis — Volume V", remit $15 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, New York.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

The HI-TURBIANT HEATER by Western Precipitation

A Vertical Direct-Fired Heater For Industrial Heating At Elevated Temperatures!

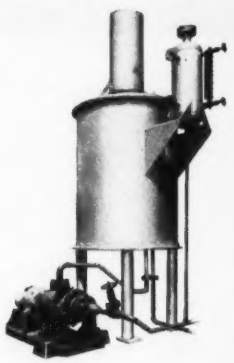
Backed by the application "know-how" and process equipment experience of Western Precipitation, the Hi-Turbiant Heater system fills a growing need in modern chemical processing operations—a means of heating high-temperature heat-transfer fluids such as Dowtherm, Aroclor, hydrocarbon oils and similar heat-sensitive fluids. It is also ideal for other applications — steam superheating, Rich-Oil denuding, asphalt heating and processes where fluids must be heated under close thermal control.

Pictured above is a 3.0 MM BTU/Hr. Aroclor Heater for use in an engineered high temperature heating system fabricated for a leading Chemical producer. The entire system was engineered in consultation at the purchaser's plant by the same Staff Engineer who will continue to provide prompt on-the-spot technical service.

Hi-Turbiant Heaters are unique in that ALL FLUIDS WITHIN THE SETTING ARE SUBJECT TO PROMOTED TURBULENCE. The process fluid is maintained at high Reynolds Number by specially designed pumps, and the products of combustion are maintained at turbulent velocities by the use of a special re-radiating baffle.

Relating baffle design to tube spacing and wall clearance permits a substantial increase in Heater length to diameter ratio while maintaining optimum average flux rate over the entire tube length.

The re-radiating Metallic Baffle is spray coated with refractory material originally developed for the high temperature and erosive conditions encountered in rocket engine combustion chambers.



An 800,000 BTU/Hr. Heating System, completely piped and wired for your pilot plant studies, is available on a loan basis. The test Heater is gas fired, with combustion safeguard and controls.

WESTERN PRECIPITATION CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9

Check 1379 opposite last page

TO IMPROVE SOLIDS-LIQUID SEPARATION PROCESSES

Consider

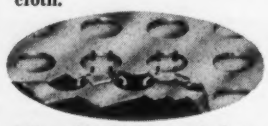
MULTI-METAL FILTER MEDIA

Wire Cloth and Filter Cloth **in all alloys, and every degree of density down to 400 mesh and in all weaves.**

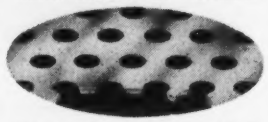
"Neva-Clog" **perforated sheet metal medium functions on edge filtration principle.**

"Mykro-Pore" **electrodeposited filter medium in pure nickel, with round or slotted holes; wide range of opening sizes, hole patterns, open area ratios and thicknesses.**

"Multibraid" (magnified); dense, strong, woven filter cloth.



"Neva-Clog" (magnified to show flow); perforated sheet metal filter medium.



"Mykro-Pore" (magnified cross-section); electrodeposited filter medium.

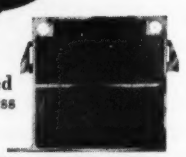
MULTI-METAL FABRICATIONS

A complete, comprehensive and versatile service in converting filter media into filtration or other processing components or complete units:

Filter leaves for all pressure and vacuum filters; screens for plate and frame presses; tubular filter elements; strainers; vibrating screens; baskets; hoppers; cylinders; elements for dryers, catalyst units, washers, mixers, etc., and complete apparatus or machinery.

"Rim-Lok" leaf for vertical or horizontal filters.

"Sweetland" filter leaf.



"Multi-Plate" fabricated filter press plate.

Elements for gas stripping process.

Vibrating screen disc.

Catalog 57 gives helpful, practical information on Multi-Metal research, engineering and product services for better methods and means of solids-liquid separation. Write for a free copy.

MULTI-METAL WIRE CLOTH CO., INC.

1356 GARRISON AVENUE • NEW YORK 59, N. Y.

Check 1380 opposite last page

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Tube cutters, expanders

Catalog of 32 pages illustrates and describes tube expanders, cutters, and operating accessories and includes complete specifications as guide to making proper selection. Cat 81 — The Gustav Wiedeke Co., 1833 Richard St., Dayton 1, Ohio.

Check 1381 opposite last page.

Protective coating

A coating which gives any mild steel resistance approaching that of stainless steel is described along with its application, its all-around advantages of protection, abrasion resistance, versatility, ductility, and weldability in manufacturer's four-page "Niphos" Bul — Tube Reducing Corp., PO Box 959, Passaic, N.J.

Check 1382 opposite last page.

Proportioning pumps

Details of proportioning pump that affords space savings of up to 2/3 over previous designs are contained in eight-page illustrated bulletin that provides dimensional specifications and capacities. Bul 302 — Hills-McCanna Company, 4571 West Touhy Ave., Chicago 30, Ill.

Check 1383 opposite last page.

Flow meters

Describing operating principle of vane-type flow meter, four-page bulletin includes data for selection of flow meter. Instrument can be used for air and other gases, water and many fluids. Bulletin V-100 is issued by Seico Instrument Division, Eclipse Fuel Engineering Co., Rockford, Illinois.

Check 1384 opposite last page.

Beryllium hygiene

The health hazard connected with handling of beryllium need not be viewed with alarm according to 12-page booklet if full advantage is taken of industrial experience already gained in the use of beryllium, and indicated safety and hygiene measures are followed.

Although this brief pamphlet is not intended to be an operating manual, it defines the problem, and provides useful checkpoints for both fabricators and processors. "Plain Talk on Beryllium" — The Beryllium Corporation, PO Box 1462, Reading, Pa.

Check 1385 opposite last page.

Heat transfer bulletin

Facilities and products of heat exchanger manufacturer are described in eight-page illustrated bulletin that demonstrates broad range of applications for equipment. "This is Ross" — American-Standard, Ross Heat Exchanger Div., Buffalo 5, N. Y.

Check 1386 opposite last page.

Nuclear products, services

Engineering and design services listed in four-sheet data memorandum are: helping customers design reactor components, design and construction of intricate tools and fixtures for fabrication, development of manufacturing facilities following prototypes, and establishment of inspection controls and programs. Nuclear products are also listed. Data Memo 23 — Nuclear Products Div., Superior Tube Company, 1512 Germantown Ave., Norristown, Pa.

Check 1387 opposite last page.

Rust inhibitor data

Effective rust inhibitors for lubricants can be produced by fractionation of mahogany sulfonates, according to 18-page report of Army research. To obtain PB131231, "The Preparation of Highly Effective Rust Inhibitors by Fractionation of Mahogany Sulfonates", remit 50c direct to Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D. C.

For corrosion protection

Handbook of 12 pages covers three most useful types of PVC lining for corrosion protection now available from manufacturer. Table compares both conventional and unplasticized linings in terms of their resistance to wide range of acids, alkalis, salts, organic compounds, and miscellaneous liquids. Manual LC-58 — Kaykor Industries, Inc., Div. of Kaye-Tex Mfg. Corp., Yardville, N. J.

Check 1388 opposite last page.

Defines conveyors

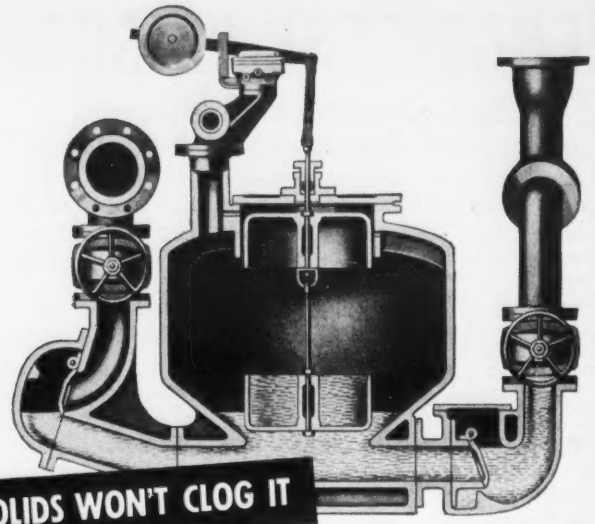
Book of 96 pages, an up-to-date and enlarged edition of an earlier publication, defines more than twelve hundred conveyor types, parts, and related equipment. It is illustrated with more than 100 line drawings. To obtain "Conveyor Terms and Definitions, Book No. 101", remit $2.00 direct to Conveyor Equipment Manufacturers Association, 1 Thomas Circle, Washington 5, D. C.

Cosmetic Services

Eight-page booklet describes services available to cosmetics industry: product duplication, applied research, irritation and toxicity studies, taste and odor problems, and engineering services. "Science of Beauty" — Foster D. Snell, Inc., 29 West 15th St., New York 11, N.Y.

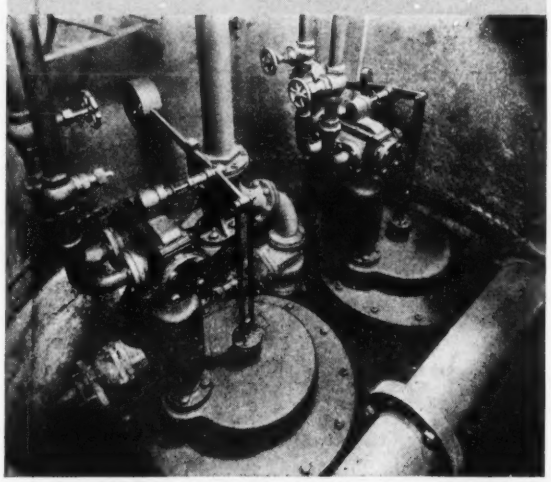
Check 1389 opposite last page.

NO MORE PUMP MAINTENANCE!



SOLIDS WON'T CLOG IT

Never Wears Out



This Shone ejector has been in operation for 68 trouble-free years —in the Auditorium Hotel (Roosevelt College), Chicago, Illinois.

- No Rotating Pump Parts
- No Airtight Floats
- No High-Speed Shafts or Bearings

Yeomans makes both pneumatic ejectors and centrifugal pumps. But for jobs from 30 to 600 g.p.m. where you need *extreme* dependability, we'll recommend a pneumatic ejector most of the time. In the long run, it's the economical choice.

Because pneumatic ejectors are clogproof and unusually simple in design, maintenance costs run 50-75% less than for the best centrifugal pump. The smallest Yeomans ejector, for example, will pass four-inch solids. And for pumping domestic and industrial wastes, pneumatic ejectors are safer, more sanitary because they are hermetically sealed.

There are seven models in over 100 sizes to choose from. All operate on compressed air with mechanical or electrical controls that are "Yeomans" foolproof. Use the coupon below to get complete information. Also see Sweet's Catalog, Architectural File.

YEOMANS PUMPS

PNEUMATIC EJECTORS

Manufacturers of pumps for: drainage • sewage • condensation return • water supply and circulation • also equipment for treatment of domestic and industrial wastes.

YEOMANS, 2003-5 N. Ruby Street, Melrose Park, Illinois

Please send me literature on the pneumatic ejectors I have checked.

☐ The Shone® ☐ The Packex® ☐ The Expelsor®

name_____

company_____

street_____

city_____ zone____ state_____

Check 1390 opposite last page

ENGINEERS "DISCOVER" ALCOA CONDUIT

Lower cost, installation economies, corrosion resistance make Alcoa Aluminum the best conduit buy

An increasing number of cost-conscious engineers are switching to aluminum rigid conduit for office buildings, industrial plants and other new and remodeled structures. Here are some of the reasons why:

- Lower prices plus light weight and ease in handling make Alcoa Aluminum Conduit installations competitive.
- Corrosion resistance of aluminum means less maintenance, freedom from staining.
- Aluminum is easier to cut, bend and thread. Wire pulling is easy, too, because of specially treated internal surface.
- Nonmagnetic aluminum offers up to 20 per cent less voltage drop.
- Clean, modern appearance complements modern architecture.
- Aluminum is nonsparking and has Underwriters' Laboratories, Inc., approval.

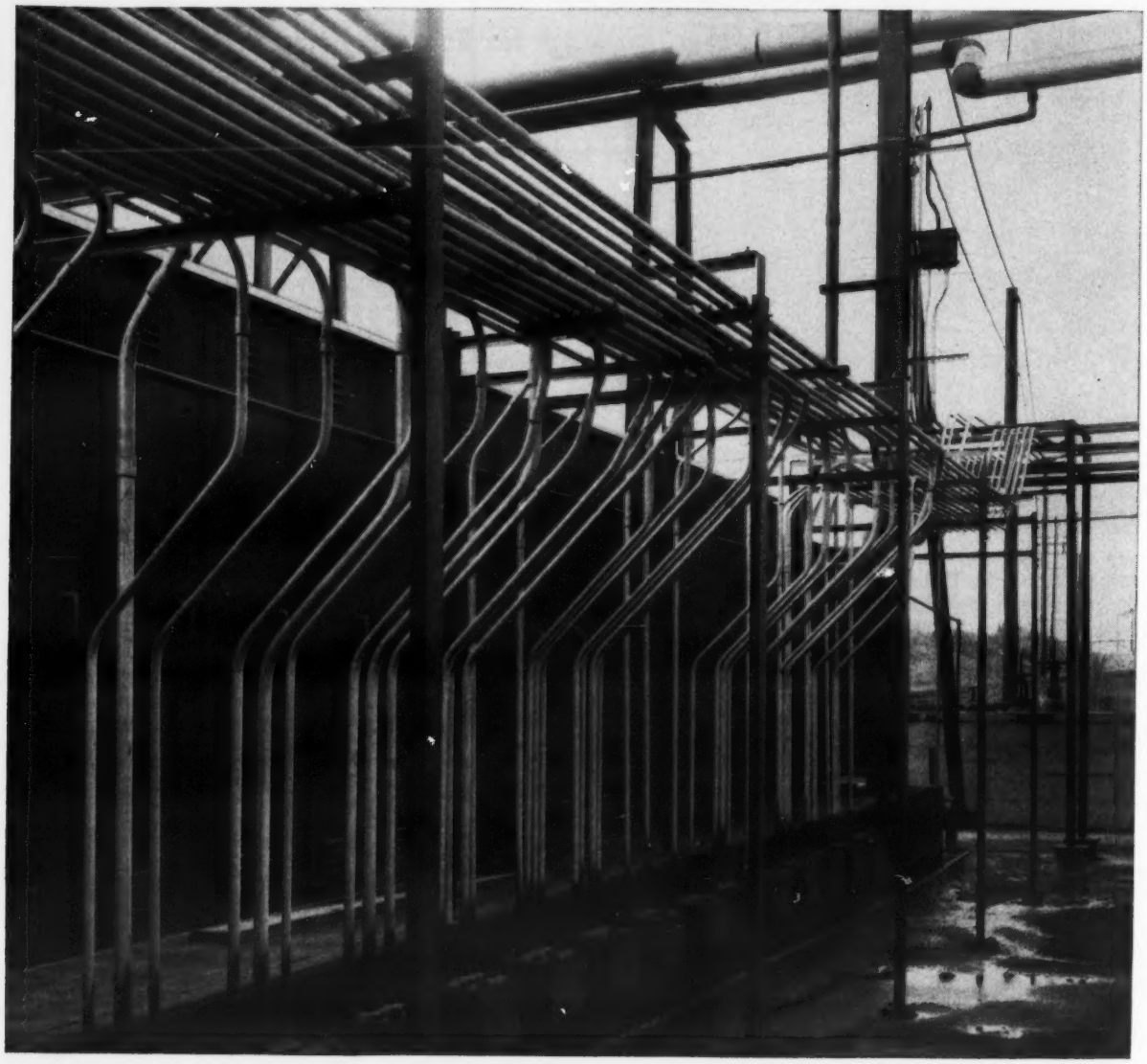
Find out why Alcoa® Aluminum is your best conduit buy. Contact your electrical distributor, or write Aluminum Company of America, 2323-J Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM CONDUIT
ALUMINUM COMPANY OF AMERICA
Underwriters' Laboratories, Inc. INSPECTED
RIGID CONDUIT
ISSUE MU-28

Your Guide to the Best in Aluminum Value

ALCOA THEATRE
Fine Entertainment
Alternate Monday Evenings

Spencer Chemical Company, Pittsburg, Kansas



Check 1391 opposite last page

NEW LITERATURE

Pump design research

Radial loads — what causes them, how to measure them, and how their effects on manufacturer's process pumps are controlled — are the subject of an illustrated eight-page Bul EM-79 — Peerless Pump Div., Food Machinery and Chemical Corporation, 301 W. Avenue, 26 Los Angeles 31, California.

Check 1392 opposite last page.

Rocket fuel studies

Two Air Force-sponsored studies of rocket fuels, one of 62 pages concerned with ignition properties of the propane-nitrogen dioxide fuel system (PB131415); and the other of 97 pages with formation of damaging detonations in combustion chambers (PB-131569) are available. To obtain PB131415 remit $1.75, and to obtain PB131569 remit $2.50 direct to Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

Iodophor concentrate

"Formulators' Manual" describes use of iodophor concentrate, Biopal VRO-20, in making sanitizing rinses, cleaners, and detergents. Antara Chemicals, Sales Div. of General Aniline & Film Corp., 435 Hudson St., N.Y. 14, N.Y.

Check 1393 opposite last page.

Dust reclamation

Bulletin of four pages describes medium efficiency, low-pressure-drop centrifugal precipitator used for primary dust collectors in pneumatic conveying, where atmospheric pollution will not be created, reduction of dust loading to more efficient final collectors, and reclamation of the large-size fraction of the dust in a dry state. Advantages and specifications of precipitator are listed in Bul 276 — American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.

Check 1394 opposite last page.

Engine cooling systems

Review of an Army survey of literature in the field of heat transfer for information which might lead to design of effective cooling systems for the smaller, lighter, more powerful vehicular engines has been made available to industry.

The 54-page report contains discussion of mechanism and applicability of four basic principles thought to offer means of satisfactory engine cooling, and identifies most promising areas for future research. To obtain PB131305, "Survey of Heat Transfer Literature", remit $1.50 direct to Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

On dispersion mills

Bulletin of four pages describes and illustrates three-roll dispersion mills for all types of materials, flowing or paste. Specifications and construction features are covered. Bul 158 — The J. H. Day Co., Div. of The Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio.

Check 1395 opposite last page.

Lists monomers, polymers

Catalog of 16 pages lists 500 monomers and polymers for research. Includes cross-linking agents, monomers for polyelectrolytes, and substituted ethylenimines. 1958 Cat — Monomer-Polymer Laboratories, Borden Chemical Company, 5000 Langdon St., Philadelphia 24, Pa.

Check 1396 opposite last page.

Black magic?

What is activated charcoal? What is it used for? Series of three 16mm movie films answers these and many more questions. Information on movie films may be obtained from Barneby-Cheney Co., Cassady at Eighth, Columbus 19, Ohio.

Proportioning pump specs

Details and specifications on manufacturer's line of proportioning pumps are covered in eight-page catalog. Maximum capacities of pumps covered range from 6cc/min to 730 gph per feed. Cat 604 — Hills-McCanna Co., 4571 West Touhy Ave., Chicago 30, Ill.

Check 1397 opposite last page.

Hammer mill details

Both 18 and 24" side-screen-change hammer mills are described in two-page bulletin that includes details on construction and design features. Specification tables along with five different briefly described installation arrangements are included in Bul 114-A — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 1398 opposite last page.

Coatings, linings

Bulletin of eight pages discusses manufacturer's facilities and services for applying corrosion-resistant coatings and describes epoxy, phenolic, and other protective coating materials for industrial equipment of all kinds. Coatings-linings Bul — Lithcote Corp., 5000 West Lake St., Melrose Park, Illinois.

Check 1399 opposite last page.

'Unconventional' power

A two-part report covers Air Force-sponsored survey of means of converting solar, thermal, chemical, and mechanical energies into electricity. Study has resulted in selection of five "unconventional" power sources which appeared most promising. Data are reported in two parts — 74-page Part 1 and 75-page Part 2. To obtain PB131411, "Unconventional Power Sources", Part 1, and PB-131218, Part 2, remit $2.00 for each direct to the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

This 68" Automatic Reineveld Centrifuge, recently installed at Corn Products Refining Co., Argo, Ill., produces 1 ton of cornstarch powder every 7½ minutes. It dries a 22° Baume Slurry to an average moisture of only 34%. The higher G-forces, possible with a Reineveld Centrifuge, result in drier products and higher tonnages.

Consult our listing in CEC or write for bulletin 356.

Sold and Serviced by:

Heyl & Patterson INC.

55 FORT PITT BLVD. · PITTSBURGH 22, PA.

Check 1400 opposite last page

Hold it!

check these new features in this new vibratory feeder from ERIEZ

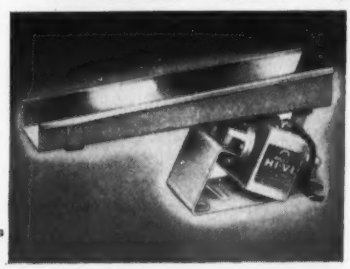
This Hi-Vi feeder has everything you want—because you* helped design it! Based on years of research among people who use feeders, it's the most efficient, most up-to-date feeder you can buy. Gives a smooth, level flow to bulk materials—permits *automatic*, accurate, controlled feed for use in spreading, sorting, separating, aerating, cooling, drying, sifting, proportioning, etc. Rate of flow is variable from ounces to tons per hour for all types of bulk materials: hot, dry, dusty, lumpy, abrasive, etc.

Note these "asked for" features —many of them Eriez exclusives!

ERIEZ HI-VI VIBRATORY EQUIPMENT

Magnetic SEPARATION AUTOMATION VIBRATION Equipment

Totally enclosed drive element—longer coil life, dust- and moisture-resistant • Electro permanent magnetic drive—has lifetime-powered Alnico V magnet, needs no rectifier • Disc type glass fiber springs—infinite spring life, rust-proof, won't pack or corrode • Greater capacity than comparable size units • Superior control—for full feed or dribble feed • Quality control—all units pre-tested and stabilized at factory.



Get the complete story. For interesting literature, write to **ERIEZ Mfg. Co., 73JC MAGNET DR., ERIE, PA.**

*Industry Users

PATENT PENDING

Check 1401 opposite last page

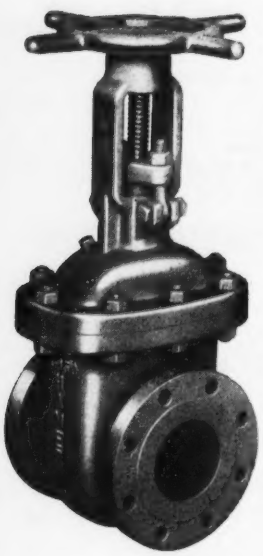
New Hamer "Wedge Seal"

LEAKPROOF GATE VALVE

"Dual" Leakproof Sealing Action

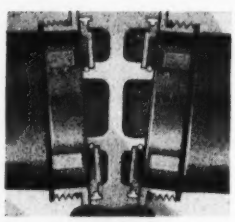
Positive Shutoff Upstream — Downstream

Serviceable in the Line



The new Hamer *Wedge-Seal*, unlike conventional Gates, incorporates a two-way sealing action that insures absolute line shut-off even on lines handling customarily hard-to-hold fluids. As the wedge is lowered to its precision metal-to-metal fit, a Teflon* seal in each side of the wedge compresses against the seats, forming a dual bubble-tight sealing action. Yet, with all of its added sealing quality, the new *Wedge-Seal* costs little more than a regular gate. Send for free literature today. See for yourself how a Hamer *Wedge-Seal* can actually pay for itself.

*RTM DuPont



Renowned for their inert characteristics, Teflon seal rings used in the new *Wedge-Seal* have amazing durability, can be replaced, when necessary with minimum effort.

Hamer VALVES INC.

2919 Gardenia Avenue, P. O. Box 1851, Long Beach 1, Calif.

Representatives throughout the world

HAMER VALVES, INC.
Box 1851, Long Beach 1, Calif.

Please send immediately your Wedge-Seal Gate Valve Bulletin WS-1.

Name_____

Company_____

Title_____

Address_____

City_____ Zone_____ State_____

58-3A

Check 1402 opposite last page

NEW LITERATURE

Photofluorometer data

High sensitivity and drift-free operation of the photofluorometer are discussed. Four-page bulletin contains schematic diagram showing how ultraviolet light is used to make the sample emit fluorescent light. Bul B-245 — Coleman Instruments Co., 318 W. Madison St., Maywood, Ill.

Check 1403 opposite last page.

Lists organics, inorganics

Catalog of 162 pages lists over 4000 fine organics, inorganic reagents, indicators, and stains. — Matheson Coleman & Bell Div., The Matheson Co., Inc., 2909 Highland Ave., Norwood 12, Ohio.

Check 1404 opposite last page.

Totalizing flow meter

Propeller-type totalizing flow meter is subject of six-page bulletin which explains operations, installation, and functions. Bul 380-K4B — Builders-Providence, Inc., div. of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R.I.

Check 1405 opposite last page.

Plastic fabricating info

Booklet of four pages presents information and illustrations on plastic fabricating techniques and products. Pre-mix molding and the use of epoxy resins for tooling are covered. Plastic Fabricating Bul — Atlas Plastics, Inc., 685 Seneca St., Buffalo 10, N.Y.

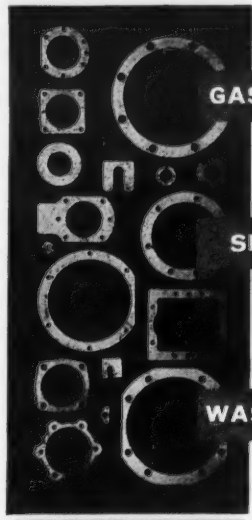
Check 1406 opposite last page.

Methocel data

Handbook of 60 pages gives technical information and application data on Methocel (methylcellulose ethers) for thickeners, emulsifiers, emulsion stabilizers, suspending agents and binders. — "Methocel Handbook" — The Dow Chemical Co., Midland, Mich.

Check 1407 opposite last page.

No Order TOO SMALL... or TOO BIG!



With more than 50 years' accumulation of dies, chances are we can furnish the gaskets, shims, or washers you need . . . *without a die charge*. This can cut your cost and speed delivery—whether you need just a few items or large quantities. Gaskets, shims, washers or special stampings are available in metallic, non-metallic and plastics to meet your production requirements.

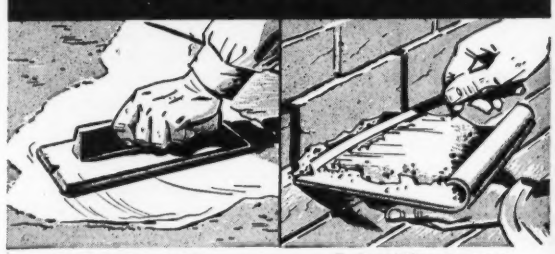
NOW...WIL-PAK PLASTIC SHIM STOCK with thickness identified by color and gauge number. Write for Bulletin No. 570.

Write for Catalog and prices

CHICAGO-WILCOX Mfg. Co.
7717 South Avalon Avenue
Chicago 19, Illinois

Check 1408 opposite last page

Save Time...
Have Lasting Concrete Repairs



Patching concrete floors. Tuck pointing masonry.

Ready-to-Use, **NON-SHRINK EMBECO PRE-MIXED MORTAR**

. . . Eliminates assembling, proportioning of materials. All ingredients accurately proportioned, thoroughly blended.

. . . Provides durable repairs because it (1) does not shrink upon hardening, (2) bonds tightly to old concrete and mortar, (3) has higher early and ultimate strength, (4) is dense, resists water and oil penetration.

FREE how-and-where-to-use folder. Write for it.

DIVISION OF AMERICAN-MARIETTA COMPANY

the MASTER BUILDERS co

CLEVELAND 3, OHIO TORONTO 9, ONTARIO

Check 1409 opposite last page

YOUR OPINIONS —

— and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *WELCOME* your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions.

By Publishing your letters in CHEMICAL PROCESSING others will have the opportunity of hearing your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

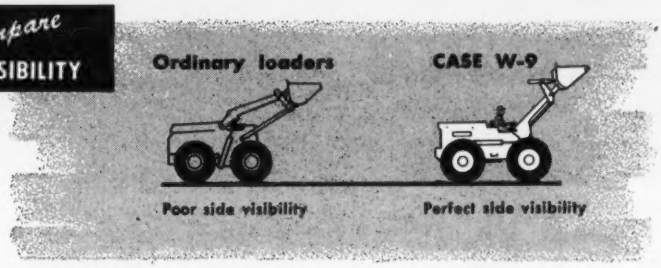
If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 7.)

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place, Chicago 11, Illinois

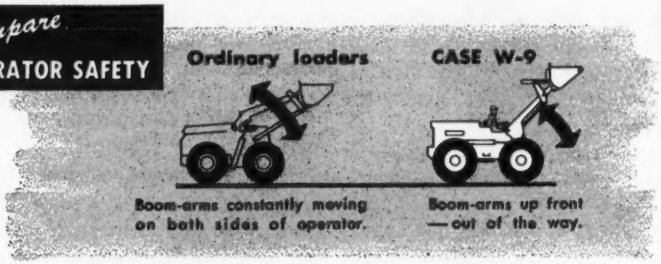
For more information on product at right, specify 1410 see information request blank opposite last page.

Let us show you how the CASE® W-9 can cut your costs

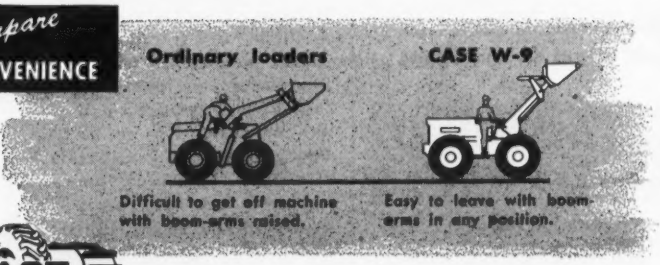
Compare VISIBILITY



Compare OPERATOR SAFETY



Compare CONVENIENCE



No matter what make of *4-wheel-drive* loaders you may own now — or are thinking of buying — it will pay you to *compare them side by side* with the new Case W-9 Terraload'r.

Field tests already have shown that this new Case-built, Case-powered loader can *dig more, carry more, dump faster — and with greater safety to the operator* — than competitive loaders costing as much as $1000 more. Best of all, the Case W-9 gives you a choice of 3 quick-change buckets — *1¼ cu. yd.* for heavy-duty digging, *1¾ cu. yd.* for standard materials; and *2¾ cu. yd.* for light materials — heaped capacities.

Remember, the *only* way to compare is to *see the W-9 in action* at your Case Industrial Dealer's — or mail coupon below for a free demonstration *on your own job.*

MAIL FOR FREE DEMONSTRATION

J. I. CASE CO., Dept. 11548
Racine, Wisconsin, U.S.A.

☐ I'd like to see a demonstration of the W-9 Terraload'r (no obligation, of course)

☐ Send free descriptive catalog

Name ..... Title.....

Company .....

Address .....

City ..... State.....

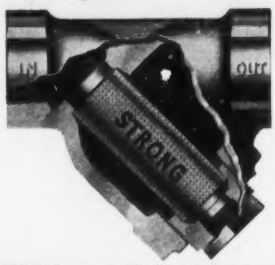
CASE
1st in quality for over 100 years

INDUSTRIAL WHEEL AND CRAWLER TRACTORS
LOADERS • DOZERS • BACKHOES • ENGINES

cleaner steam systems... more positive regulation... use STRONG

STRAINERS

Built-in preventive maintenance • positive protection against dirt and scale in a system • clog-free operation • quick, simple cleaning

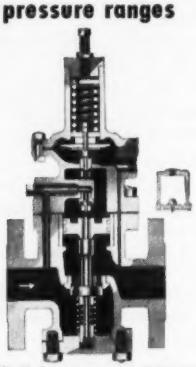


STRONG Strainers with threaded pipe connections: semi-steel (¼"-3"), cast steel (⅜"-2") and cast bronze (½"-2").

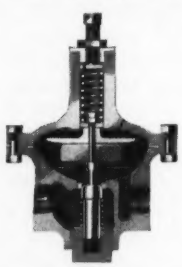
Flanged STRONG Strainers: semi-steel and cast steel (1½"-6"). Block Steel Strainers available for pressure to 10,000 psi.

REDUCING VALVES

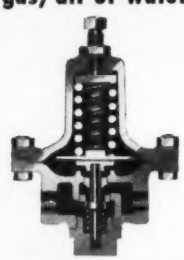
Accurate pressure control • simple adjustment • trouble-free operation • long service life • wide selection of types, sizes and pressure ranges • for use with steam, gas, air or water



Type "C" Valve: screwed (½"-1½") or flanged (2"-4") stainless steel trim, for 0-250 psi (semi-steel), 0-600 psi (cast steel).



Type "K" Valve: screwed (½"-1½"), built-in strainer, for pressures to 225 psi (semi-steel).



Type "O" Valve: screwed (⅜"-¾"), for pressures to 225 psi (semi-steel).

4/S

For complete information on these and other STRONG STEAM SPECIALTIES, contact your local STRONG Distributor or write for your copy of the new Catalog No. 69A today.

STRONG, CARLISLE & HAMMOND

508 Sandusky Street • Conneaut, Ohio

steam traps • air traps • float traps • F and T traps • vacuum or pumping traps • continuous blowdown valves • separators • engine stops

Check 1411 opposite last page

NEW LITERATURE

Centrifugal pump data

Technical article of six pages explains correct method of superimposing process system and pump hydraulic characteristic data to select correct and most economical-size pumps. Pump features and impeller design suggestions for pumping corrosive and erosive media are included. "Centrifugal Pumps — Their Evaluation and Selection" — Centrifugal Pump Dept., Ampco Metal, Inc., 1745 S. 38th St., Milwaukee 46, Wis.

Check 1412 opposite last page.

Aerosol filling

Bulletin of eight pages illustrates and describes addition to manufacturer's series of high production aerosol pressure filling machines. Filling Machine Bul — Alpha Engineering & Machine Works, Inc., 800 W. Central Rd., Mount Prospect, Ill.

Check 1413 opposite last page.

Explains blending

System's ability to blend dry pulverized materials that differ in bulk density and fineness is explained in 16-page bulletin that discusses operation, installation, and blending problems. Explanation is augmented by detailed illustrations and drawings. Bul B-2 — Fuller Company, Subs. of General American Transportation Corp., Catasauqua, Pa.

Check 1414 opposite last page.

On handling bromine

Review of bromine's characteristics, containers, and methods of shipment, handling systems in plant and laboratory, accident prevention and protection, and first aid are covered in 36-page booklet on "How to Handle Bromine" — which may be obtained on letterhead request to Bromine Technical Sales Division, Michigan Chemical Corp., St. Louis, Mich.

Firms like these:

General Electric Company
Parke, Davis & Company
Commercial Solvents Corporation
Monsanto Chemical Company
Westinghouse Electric Corporation
Radio Corporation of America
Walter Kidde & Company
E. I. Dupont De Nemours & Co.
Pitman-Moore Company
Carbide & Carbon Chemicals Company
Southern Comfort Corporation
Linco Products Corporation
Atomic Energy Projects
Brookhaven National Laboratory
Stoelting Brothers
Kolmar Laboratories
The Haloid Company
Mallinckrodt Chemical Works

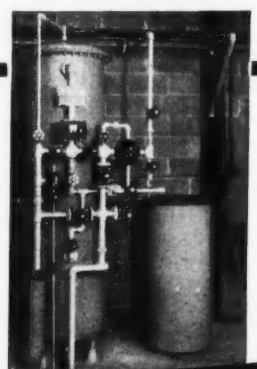
are saving dollars with ELGIN DEIONIZERS

—and there are scores of equally well known organizations that are cutting costs with Elgin Deionizers.

The Elgin Single-Tank Mixed-Bed Deionizer, illustrated below, produces demineralized water of higher chemical purity than distilled water, at a small fraction of the cost of distillation.

It removes *all* ionizable impurities including CO_2 and silica . . . does it dependably and at lowest investment and operating cost.

Let us put our 50 years of experience to work on your water conditioning problem. Write for Bulletin 512.



ELGIN
Single-Tank, Mixed-Bed
DEIONIZER

ELGIN SOFTENER CORPORATION
180 N. GROVE AVENUE • ELGIN, ILLINOIS

Zeolite Water Softeners
Dealkalizers
Deaerating Heaters
Filters of all types
Water conditioning products for every need

50th Anniversary 1958

Check 1415 opposite last page

Tube for nuclear power

Two major classes of applications for small diameter tube — fuel elements and heat exchangers — are presented in 6-page bulletin. Typical end uses for tube are listed as specifically as their classified nature will permit. Data Memo 20 — Superior Tube Co., 1512 Germantown Ave., Norristown, Pennsylvania.

Check 1416 opposite last page.

Organic intermediates

Four-page catalog includes over 100 organic intermediates for dyestuff, textile, paint, metal, rubber, and drug industries. Organics — Aceto Chemical Co., Inc., 40-40 Lawrence St., Flushing 54, New York.

Check 1417 opposite last page.

Revolving-shelf oven

Bulletin provides information on capacity, temperature, dimensions, construction, and electrical characteristics of revolving-shelf oven. Bul 5692 — National Appliance Co., Swan Island, Portland 18, Oregon.

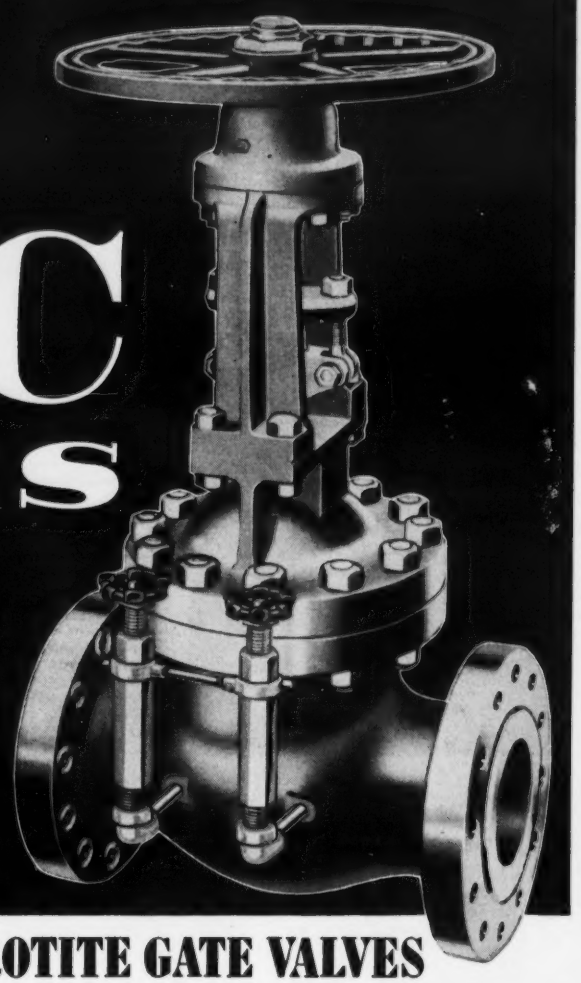
Check 1418 opposite last page.

"Cathodic? . . . Heavens! I thought you said you wanted to set up a CATHARTIC reaction!"

ACCO
for Better Values

R-P&C VALVES

THE COMPLETE LINE
—DESIGNED FOR DEPENDABILITY



R-P&C "Sure-Tight" LUBROTITE GATE VALVES

—THE MULTI-SERVICE VALVES LUBRICATED THROUGH THE SEAT RINGS

Lubrotite Gate Valves—created and patented by R-P&C—are built to provide absolute tightness and long, trouble-free service in handling all fluids for which iron and cast steel valves are serviceable.

By the unique Lubrotite system, in which each seat ring is served by a Lubrotite gun, a lubricant seal is forced through to the valve's seating surface. This lubricant prevents leakage, retards corrosion, prevents sticking, reduces wear on seating surfaces and makes for easier operation. Net result: reduced operating, maintenance and over-all valve costs!

Available in cast steel and iron types. A wide variety of lubricant seals, each suitable for numerous services, can be furnished.

Lubrotite Gate Valves are giving highly successful service in handling—

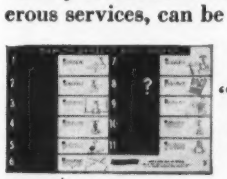
Gasoline...Oil...Benzol...HF Alkylation... other Petroleum Derivatives —

Natural and Artificial Gas...Air... Helium Gas...Coke and Gas...Water —

Vacuum Service (evaporation, etc.)... Feed Water Lines and Steam Plants —

Mine and Acid River Waters... Certain Chemicals...Other Services

Lubrotite Gate Valves form a part of the complete R-P&C line, which includes gate, globe, angle and check valves in all standard materials; all in a wide range of sizes, styles and pressure classes. Order through nearby R-P&C Distributor. Write our Reading office for catalog.



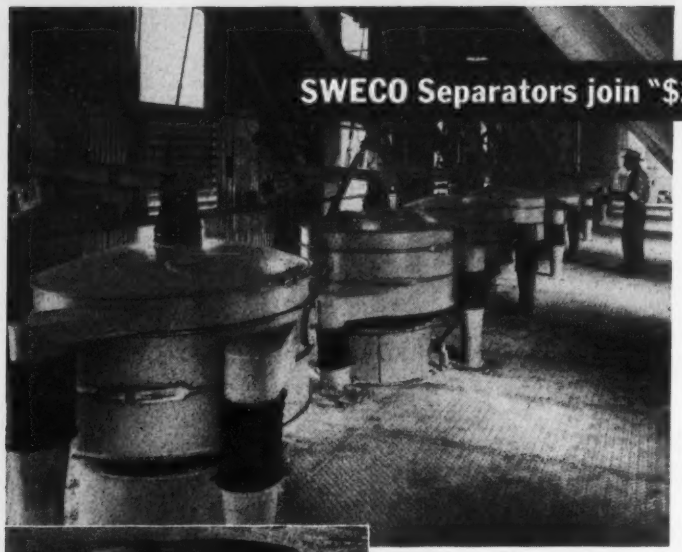
FREE WALL CHART
"How to Protect Your Valves"
Installation pointers, operating tips, clues to longer valve life. They are all on this 22" x 17" wall chart. Write for your free copy.

R-P&C VALVE DIVISION
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO

Check 1419 opposite last page



SWECO Separators join "$20 Million Team" for U.S. Borax

At the new $20-million U.S. Borax plant at Boron, Calif., SWECO Separators handle a wide variety of product and process screening in the production of borates. This is typical of the kingsize processing jobs SWECO Vibrating Screen Separators are performing throughout industry, setting new standards of efficiency and economy.

Technical Screening Data on 117 Chemical Products

The screening know-how gained in installing more than 550 SWECO Separators in chemical process industries is available on request. Whatever kind of material you screen – wet or dry, coarse or fine, heavy or light – SWECO's experience can help you improve your product quality and cut your screening costs. Write today. Address Dept. 202-3 and ask for: the Screening data on your particular material and the new SWECO Separator Catalog . . . or a call from your local SWECO District Engineer.

ABOVE: *Twenty-seven 48" diameter* SWECO *Separators used for product screening at the U.S. Borax plant.*

LEFT: *Airview of the plant and the world's first open-pit borax mine.* SWECO's *Engineering & Construction Division handled the design, engineering and procurement for the huge refinery in a joint venture with Twaits-Wittenberg Co.*

SWECO SEPARATORS

Southwestern Engineering Company
4800 Santa Fe Avenue, Los Angeles 58, Calif.
LUdlow 3-6262 – Cable: SWECOLA
Engineers and Constructors . . . Manufacturers

Check 1420 opposite last page

MAISCH

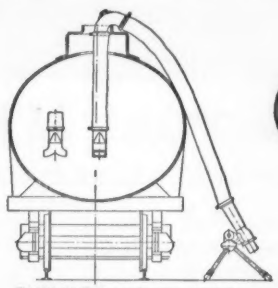
METERING PUMPS

- STAINLESS STEEL – OILLESS BEARINGS – STERILIZABLE
- POSITIVE DISPLACEMENT – SMOOTH, NON-PULSATING FLOW
- FOR HOT, COLD, VISCOUS OR WATERY FLUIDS
- ACCURATE WITHIN 1 TO 2%

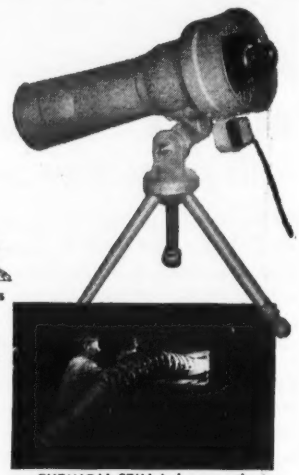
Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Write for complete details and prices.

MECHANICAL PRODUCTS CORPORATION
174 North Ogden Avenue • Chicago 7, Illinois

Check 1421 opposite last page



TANK CAR is easily freed of fumes for workers' safety.



CHEMICAL STILL is here ventilated while being repaired.

KEEP AIR FRESH

in confined places with COPPUS

Design "A" Ventilator

Improve workers' safety — health — comfort — efficiency. Get rid of dangerous gases, fumes, stagnant air. Coppus Design "A" Ventilator ventilates tanks, tank cars, drums, vats, underground cable manholes, pipe galleries, airplane wing compartments, fuselages. For complete information, write Coppus Engineering Corporation, 389 Park Ave., Worcester 2, Mass. Sales Offices in *Thomas' Register.*

Other "Blue Ribbon" Products in *Chemical Engineering Catalog, Refinery Catalog, Best's Safety Directory* and *Mining Catalogs.*

ANOTHER **COPPUS** "BLUE RIBBON" PRODUCT

Check 1422 opposite last page

NEW LITERATURE

Aluminum chemicals

Handbook, of 48 pages summarizes technology of present industrial applications of aluminum chemicals and suggests new uses. "Aluminum Chemicals" may be obtained by letterhead request to Reynolds Metals Co., 2500 South 3rd St., Louisville 1, Ky.

Apparatus catalog

Mechanical high-vacuum pumps and thermistor telethermometers with interchangeable probes are examples of equipment in manufacturer's 16-page laboratory catalog. LabLog 1-58 —Will Corporation, Rochester 3, N.Y.

Check 1423 opposite last page.

Bulk handling container

Manufacturer's revised bulletin on bulk handling individualized shipping containers describes steel, stainless steel, and aluminum designs for railroad or truck shipment of raw and semi-processed materials. Bul 132-A — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 1424 opposite last page.

Polysulfide polymers

Latest developments for caulking and sealing compounds based on polysulfide liquid polymers are in eight-page booklet. Bul 2-58 — Thiokol Chemical Corp., 780 N. Clinton Ave., Trenton 7, New Jersey.

Check 1425 opposite last page.

Portable voltmeters

Series of three 2-page bulletins describe portable transistorized voltmeters. Instruments are designed for precision work. Bulletin 7000 — Alectra Division, Consolidated Electrodynamics Corp., 325 N. Altadena Dr., Pasadena, California.

Check 1426 opposite last page.

Conventional and 45° bevel type Pumcups.

● The *right* piston packing for reciprocating pumps and cylinders goes a long way toward eliminating the problems of slippage, maintenance and down-time.

Because Darcova Pumcups are made in a complete range of sizes, various types, and in many texture-engineered compositions, they *fit* your temperature-pressure-fluid conditions. That's one important reason why they usually outlast other packing at least 3 to 1 while holding top efficiency to the last!

Why not get *all* the facts? Send today for Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA
TRADE MARK
PUMCUPS

Check 1427 opposite last page

Store or ship your products in

Ellisco
CANS for CHEMICALS

a wide range of styles, shapes, and sizes offer
POSITIVE PROTECTION

The variety of sizes and types of ELLISCO cans available to package your dry, semi-liquid or liquid products is almost as great as their uses. These popular containers are available in square, rectangular or round types with snug-fitting slip covers, single friction or double friction plugs, or screw caps to seal contents in, dust and moisture out.

ROUND CANS: ¾" to 17⅞" Diameters. 1½" to 30" Body Heights.
SQUARE CANS: 2¼" x 2¼" to 11½" x 11½" Base Dimensions. 2" to 12" Body Heights.
RECTANGULAR CANS: 2⅛" x 1¾" to 7¼" x 5⅛" Base Dimensions. 2" to 12" Body Heights.

Many types and sizes are available from stock. Special shapes and sizes can be made to order. Write, wire or call for full details.

ROUND SLIP COVER CANS
May be tape sealed if air tight closures are required.

LITHOGRAPHED CANS
Cans of all shapes and sizes may be lithographed in your design and color combinations.

ROUND CORNERED, SQUARE AND RECTANGULAR CANS

GEORGE D. ELLIS & SONS, INC.
4018 N. AMERICAN ST., PHILADELPHIA 40, PA.
BAldwin 3-3405

Check 1428 opposite last page

NEW LITERATURE

Cable supporting

Loose-leaf catalog of 60 pages contains latest information on manufacturer's line of cable-supporting systems including cable trough, cable ladder, cable channel, and systems supports and accessories. Cable Supporting Systems Cat — T. J. Cope Div., Rome Cable Corp., Collegeville, Pa.

Check 1429 opposite last page.

Small valve catalog

Catalog of 12 pages is devoted to descriptive information and technical data related to nine different valve series for instrumentation and design. Cat MV-957 — Hoke, Inc., 136 South Dean Street, Englewood, New Jersey.

Check 1430 opposite last page.

Boron nitride data

Bulletin of four pages on boron nitride sets forth properties, advantages, and uses of this easily machined, impermeable ceramic material that possesses good electrical and corrosion-resistant properties up to 3000°F. Boron Nitride Tech Bul — The Carborundum Co., PO Box 337, Niagara Falls, N.Y.

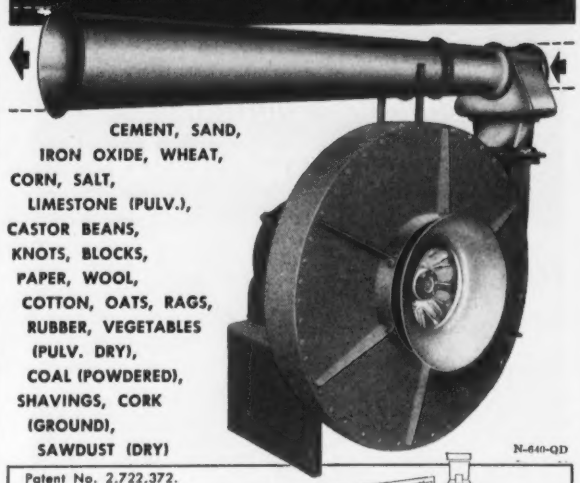
Check 1431 opposite last page.

Surface-active agent data

Manual of 40 pages on nonionic surface-active agents made from nonylphenol or tridecyl alcohol with ethylene oxide provides information on analytical procedures, properties, and industrial uses. "Surfonic® Tech Bul" may be obtained by letterhead request to Jefferson Chemical Co., Inc., 1121 Walker Ave., Houston 2, Tex.

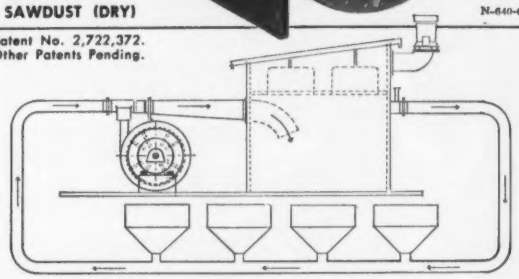
For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

NOW... ANY MATERIAL THAT CAN BE MOVED BY AIR CAN BE MOVED BY *Quickdraft!*



N-640-QD

Patent No. 2,722,372.
Other Patents Pending.



TYPICAL EXAMPLE — Q-8 Stainless Steel Quickdraft Materials Handling Unit 77" long, 60 HP 3,450 RPM motor, high-pressure turbo blower, exhausting into 13 x 15 x 15 storage room, pulling through 400 ft. of open 8" pipe. Negative static pressure readings taken 7 diameters back of Quickdraft — 17.6" WG, velocity 11,676 FPM pulling 135 ft. . . . 18.6" WG, velocity 9,306 FPM pulling 270 ft. . . . 19.3" WG, velocity 6,074 FPM pulling 400 ft.

NEW HEAVY-DUTY HIGH-PRESSURE EXHAUSTERS MOVE BULK MATERIALS QUICKLY, EFFICIENTLY, ECONOMICALLY

Bulk materials are moved without downtime for replacing fan blades, motors or bearings . . . with high pressure Quickdraft Materials Handling Units. Open or closed systems can be used. Quickdraft is also ideal for exhausting paint spray, abrasives, corrosive gases, noxious fumes and high temperatures. Models range from 6 to 30-inches in diameter. For engineering data on high-pressure Quickdraft Units for materials handling . . . heavy duty models for industrial exhausting . . . standard models for heating-plant venting . . . *write today!*

IMPORTANT NOTICE

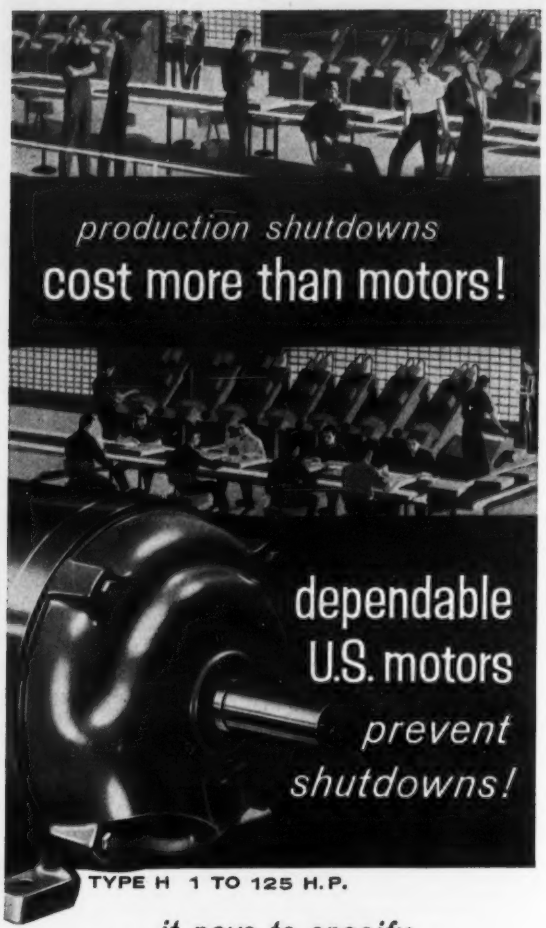
For withstanding corrosive gases all Quickdraft units are available in standard acid resisting vitreous enamel, No. 316 Stainless Steel, rigid plastics (PVC), and with plastic and Fiberglas coatings.

NO MOTORS, FANS OR BEARINGS IN EXHAUST LINE!

Quickdraft CORPORATION
P.O. Box 87-Q • Canton 1, Ohio

Well known for power draft units for all types of heating plants.

Check 1432 opposite last page



...it pays to specify

U. S. Uniclosed Motors

Because production shutdowns *cost far more than motors,* real economy lies in buying motors of *quality* you can depend on! U.S. UNICLOSED is the motor choice for normal production needs. U.S. UNICLOSED MOTORS give you the quality and dependability that are built into every U.S. motor—plus protection *far* superior to ordinary dripproof motors. Only U.S. protects all windings with nature's non-organic, non-carbonizing insulation—asbestos! This prevents costly burn-outs. Unlike ordinary makes, U.S. motors have shock-resistant, corrosion-resistant cast iron frames that are *normalized*—heat-seasoned to prevent warp! To protect bearings, U.S. LUBRIFLUSH transverse lubrication purges old grease. This minimizes lubrication and maintenance requirements. These and many other factors add up to U.S. *quality*—the kind you can depend upon to keep production lines running! U.S. UNICLOSED 3-phase AC motors are available in RATINGS ¼ to 250 H.P. It pays to specify: "U.S. MOTORS."

U.S. ELECTRICAL MOTORS INC.

P. O. BOX 2058, LOS ANGELES 54, CALIF. OR MILFORD, CONN.

FREE COLOR-ILLUSTRATED BROCHURE. For detailed data on Uniclosed Motors, write for Uniclosed Bulletin No. F-1856

Check 1433 opposite last page

NEW LITERATURE

Off-ground maintenance

Illustrated with many application photos and drawings, manufacturer's bulletin shows exactly what scaffold and ladder equipment to use for typical maintenance jobs. Bul G-205RR — The Patent Scaffolding Co., Inc., 38-21 12th St., Long Island City 1, N. Y.

Check 1434 opposite last page.

Vibrating screen catalog

Complete data and specifications on vibrating screens and screening feeders are presented in 14 pages of manufacturer's illustrated vibrating screen cat — Syntron Company, 110 Lexington Ave., Homer City, Pa.

Check 1435 opposite last page.

All about corn starch

Digest-size, 44-page booklet discusses corn starch, describes the starch-manufacturing process, and best handling procedures. Appendix includes an analytical examination of the starches. "Corn Starch" — Corn Industries Research Foundation, Inc., 3 East 45th St., New York 17, New York.

Check 1436 opposite last page.

Stainless containers

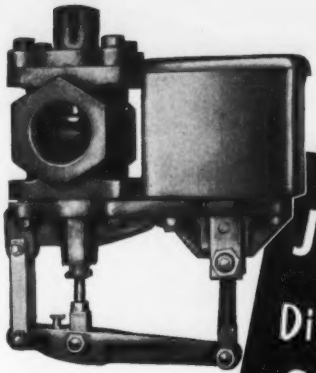
Bulletin points out and illustrates features of 30- and 55-gal stainless steel containers. Complete dimensions are provided. Stainless steel container bul — Pressed Steel Tank Co., Milwaukee 14, Wis.

Check 1437 opposite last page.

Pyridine N-oxide

Pamphlet of five pages on history and properties of pyridine N-oxide also presents a review of reactions and applications. "Pyridine N-oxide" — Beacon Chemical Industries, Inc., 33-51 Richdale Ave., Cambridge 40, Mass.

Check 1438 opposite last page.



OUTSTANDING FOR STEAM SERVICE

JOHNSON Direct Operated SOLENOID VALVES

Stainless steel valve and seat. Sizes: ½" to 3". Write for facts.

Job after job, these Johnson Direct Acting Solenoid Valves are proving an ideal answer for service on steam lines. Their design removes the solenoid proper from the heat of the line, permits a leverage system with ample power to open against differential pressures up to 150 lbs. There are no pilot valves or auxiliary pistons, and construction is really heavy duty throughout. You will find their inherent simplicity and instant response will solve a lot of operating problems like no other valve can.

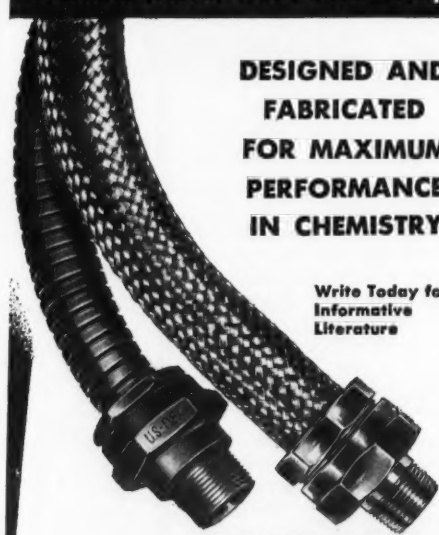
THE JOHNSON CORPORATION

826 Wood St., Three Rivers, Mich.

Check 1439 opposite last page

STAINLESS

Flexible Metal Hose and Components



DESIGNED AND FABRICATED FOR MAXIMUM PERFORMANCE IN CHEMISTRY

Write Today for Informative Literature

U.S.flex

U. S. FLEXIBLE TUBING CO.

219 MAIN STREET BARTLETT, ILLINOIS

Check 1440 opposite last page

NEW LITERATURE

Water treatment aid

Water impurities and method of treatment, typical treatment systems, aerators, deaerators, precipitation equipment, filters, and ion exchange equipment are discussed in manufacturer's "refresher course" on treatment of industrial, boiler-feed, and municipal water supplies. Bul 4433 — Permutit Co., Div. of Pfaudler Permutit Inc., 50 West 44th St., New York 36, New York.

Check 1441 opposite last page.

Petroleum solvents info

Basic considerations in the proper handling of petroleum solvents are pointed out in manufacturer's eight-page "How to" booklet. Booklet contains an extensive bibliography of additional reference material dealing with solvents. "Handling Petroleum Solvents" — Esso Standard Oil Company, 15 West 51st St., New York 19, N. Y.

Check 1442 opposite last page.

Anti-skinning agents

Bulletin on three anti-skinning agents for paints presents four pages of data including specifications, physical properties, and performance charts for four different types of paint and enamels. Data Sheet 20758 — National Aniline Div., Allied Chemical Corporation, 40 Rector St., New York 6, New York.

Check 1443 opposite last page.

Versatile material handler

Bulletin of four pages covers multi-purpose material handling truck which can be equipped as fork lift, gravity dump hopper or tailgate dump truck, or a platform deck material handling unit. Condensed specifications are listed in bulletin on "Moto-Bug" — Kwik-Mix Co., Div. of Koehring Co., Port Washington, Wisconsin.

Check 1444 opposite last page.

*with this valve design**

COMPRESSOR GOING STRONG 36 YEARS AND 4 OWNERS LATER

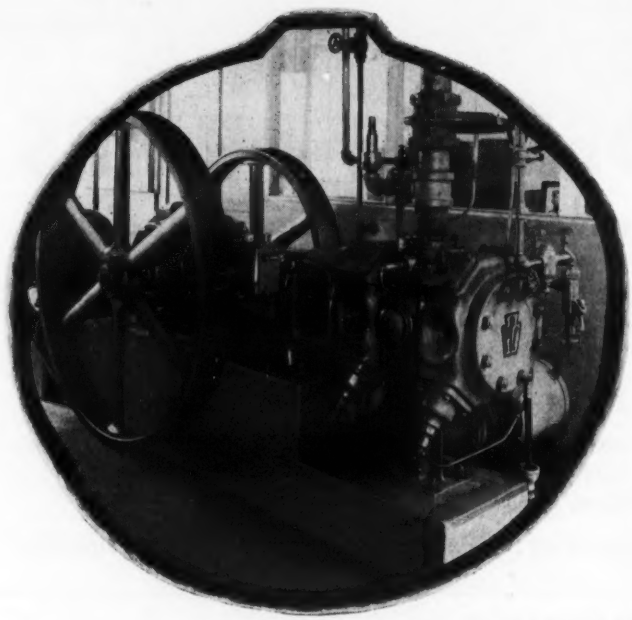
Customers sometimes ask us what it takes to wear out a Pennsylvania compressor.

We don't blame them. Endurance records are extraordinary. Downtime and maintenance costs are extremely moderate.

One Pennsylvania Compressor, for example, originally purchased by a Philadelphia firm in 1922, has been in continuous operation for *36 years!* Moreover, because of mergers or plant alterations, the compressor has changed hands three times and for the last ten years has been delivering as faithfully as ever for its *fourth* owner.

We recently furnished the owner a few replacement parts. Probably, we will be furnishing replacement parts once again in another ten years.

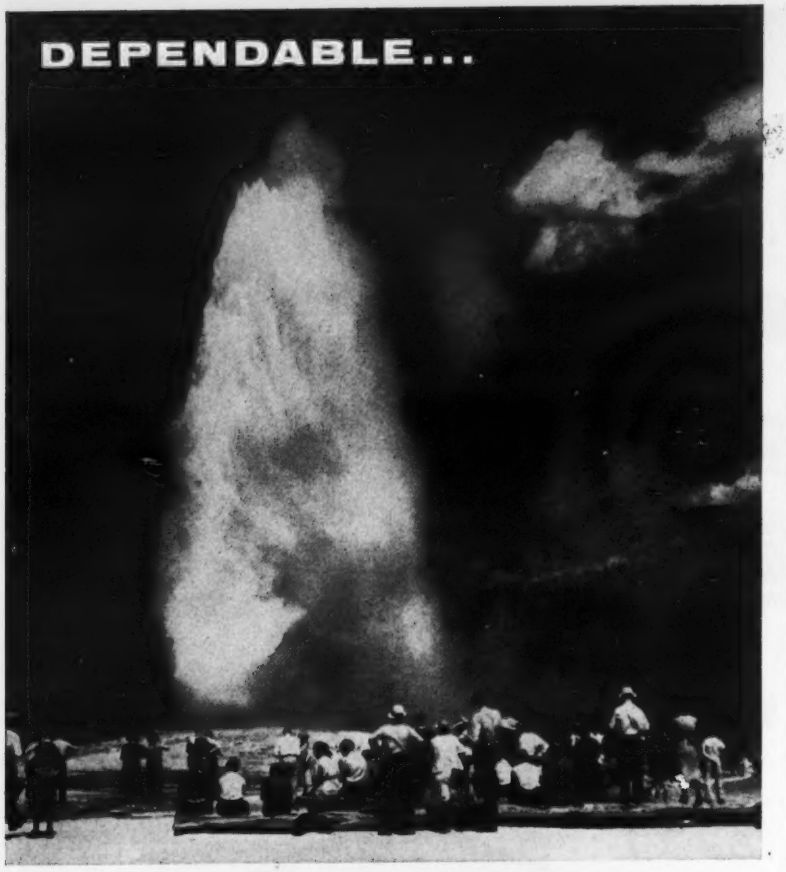
Somewhere in our line is a compressor that will stay on the job for you. Why not write for our brochure COMPRESSORS FOR INDUSTRY describing Pennsylvania compressors from 10 to 350 hp.



**With this valve,* Pennsylvania compressors will perform faithfully for years. It is the Air Cushion Valve, constructed without nuts, bolts, or screws. Stainless steel valve discs lift against a soft cushion of air; there is no flexing or bending action to weaken them. They will remain perfectly flat and tight seating over long periods of service.

PENNSYLVANIA
PUMP AND COMPRESSOR CO.
Easton, Pa. • Earning Customer Confidence Since 1920

Check 1445 opposite last page



DEMING PUMPS

proven performance in industry

Through dependable performance it has become a matter of record that "Old Faithful" performs by the clock. It's also a matter of record that dependable Deming Pumps are recognized throughout industry for proven performance . . . and the ability to handle a wide variety of liquids for diversified industrial applications.

A wide selection of more than 10,000 types, sizes and capacities to meet your specific industrial requirements is available from the complete, Deming line of Pumps.

Depend on Deming . . . write for complete information.

THE DEMING COMPANY 522 BROADWAY, SALEM, OHIO

Please send me a copy of your Industrial Pump Bulletin I-57-E describing pumps for every industry.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

Check 1446 opposite last page

NEW LITERATURE

Polyethylene mixtures

An easy means for molders to find the preferable proportions rapidly in the mixing of high and low pressure polyethylenes is provided in bulletin which contains charts outlining in detail the densities, melt indices, stiffness, and tensile yields of pieces molded from full range of polyethylene pellet mixtures. Bul TSB-4-58 — Plastics Div., Koppers Co., Inc., 950 Koppers Bldg., Pittsburgh 19, Pa.

Check 1447 opposite last page.

Points up tractor features

Illustrated bulletin of 14 pages points up features of diesel crawler tractor and includes specifications. Large cutaway view of both gear transmission and torque converter models are presented in Bul MS-1289 — Construction Machinery Div., Allis-Chalmers Manufacturing Co., Milwaukee 1, Wisconsin.

Check 1448 opposite last page.

Rubber-lined pipe joints

How to achieve speed and flexibility in design, installation, and on-the-spot repair of rubber-lined pipe systems with manufacturer's joints is covered in six-page illustrated bulletin. Rubber-lined pipe joint bul — LaFavorite Rubber Mfg. Co., 275 Wagaraw Rd., Hawthorne, N. J.

Check 1449 opposite last page.

More Adecane data

Expanded data on straight-chain saturated hydrocarbons called Adecanes, is now available. Properties, typical compositions, solubility, and additional details to the information supplied in CHEMICAL PROCESSING's article on pages 76-78, August 1957. "Data sheet A-16" — Archer-Daniels-Midland Co., 700 Investors Bldg., Minneapolis 2, Minnesota.

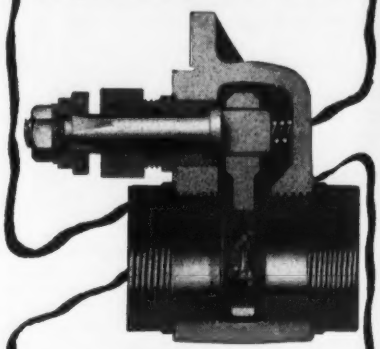
Check 1450 opposite last page.

FULL-FLOW

Okadee

VALVES

NON-LUBRICATED



POSITIVE STOP

FOR

- Steam
- Air
- Ammonia
- CO_2
- Gasoline
- Propane
- Styrene
- Butadiene
- Lube Oils
- Jet Fuels

Available in Stainless Steel or Steel, Chemically Nickel Coated

You can select Okadee Valves for flow by pipe size — and get full-flow and positive shut-off with virtually any liquids and gases.

Quick-opening, metal-to-metal disc valves and seats require no lubrication — virtually no maintenance for hundreds of thousands of operations . . . Real valve *performance* and *service*.

FACTS AND FIGURES

. . . on Okadee Valves will be sent promptly on request. Sizes ½" to 8"; A.S.A. dimensions; screwed or flanged. Valve seats and discs Stellite or stainless steel; your choice of operators.

• Write for Bulletin CP6

Okadee COMPANY

332 SOUTH MICHIGAN AVENUE

CHICAGO 4, ILLINOIS

Check 1451 opposite last page

Vapor pressure

High-speed, high-accuracy technique for measuring vapor pressure of volatile liquids is discussed, and equipment used is described in four-page illustrated Bul FS-272 — Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pennsylvania.

Check 1452 opposite last page.

Aminopyridine info

"Pocket-size" booklet gives physical constants of ten pure aminopyridines, specifications, and typical reactions. Aminopyridine Booklet — Reilly Tar & Chemical Corp., Merchants Bank Bldg., Indianapolis 4, Ind.

Check 1453 opposite last page.

Adipic acid manual

Reactions, current uses, and potential applications for adipic acid are contained in handsome hard-covered 78-page technical encyclopedia. For "Adipic Acid Manual," remit $1.00 direct to R. C. Molden, Polychemicals Dept., E. I. du Pont de Nemours & Co., Fairfax, Wilmington 3, Delaware.

"This is your last warning about lunch hour gambling."

News and Notes on...

Good Packing Practice

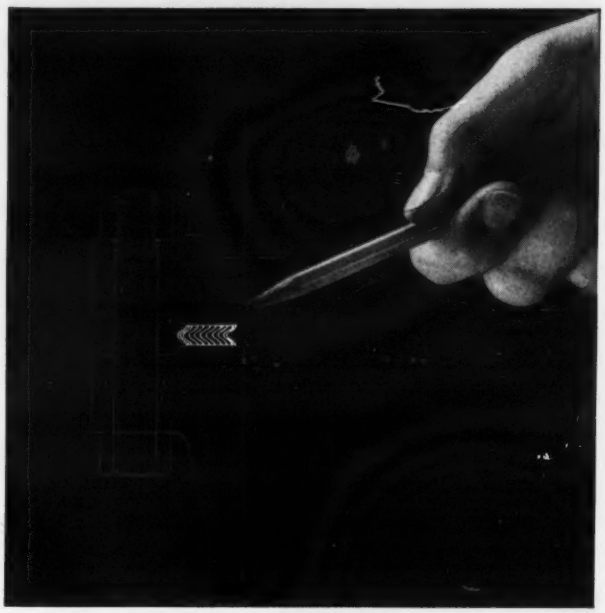
JOHNS-MANVILLE JM PRODUCTS

Maintenance and Design Hints from Johns-Manville Packings and Textiles Dept.

Subject of the month: Selecting the Gasket

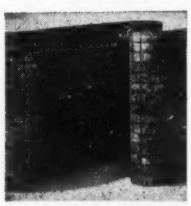
Question:

What are the important points to remember about gasket applications so we can avoid costly failure?

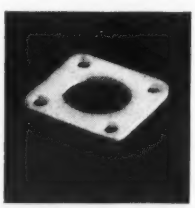


GASKET engineering is a complex study, but there are certain simple answers to this commonly asked question. Briefly, at least three variables must be considered. These are: 1. The available bolt force on the gasket. 2. Internal pressure and temperature. 3. The nature of the contained fluid.

Starting with bolt force: it must be adequate to flow the gasket material and cause it to yield and seat effectively. Secondly: the bolt force must also always be sufficient to exceed the internal pressure and temperature forces that work against gasket closures. Finally: the gasket material must be impervious to the action of the confined fluid.

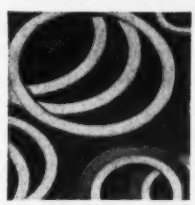


For service at low to medium temperatures and pressures: As a rule of thumb, if multiplying the operating pressure (psi) by operating temperature (°F) results in a product not exceeding 250,000, a quality "general service" type gasket can be used with complete safety. An outstanding gasket material for these operating conditions is J-M Service® Sheet #60 . . . a tough, durable compressed asbestos sheet. Service Sheet seals effectively against hot or cold water, steam, oils, mild acids and caustics.



If corrosive fluids are encountered: The best solution to the constant attack of chemicals and solvents is a gasketing material that is chemically inert. For this kind of service condition, Johns-Manville Teflon* Chempac® Gaskets are recommended. They are available in pure Teflon, low-flow Teflon-Asbestos, and in metal-(glass-filled) Teflon, Teflon combinations.

*TM for DuPont Tetrafluorethylene resin.



When extreme pressures and temperatures act on the gasket: If internal pressures reach 1200 psi or temperatures exceed 850°F, safe practice calls for a sturdy gasket that offers the high resiliency needed to follow expanding and contracting movements of flanges. For standard flange applications to 6,000 psi, you will find metal-asbestos, spiral-wound Goetze Spirotallic® gaskets most efficient. They offer high mechanical strength and resilience. Their special interlocking design and stainless steel construction is especially designed to effect and maintain a tight seal despite wide pressure and temperature variations.

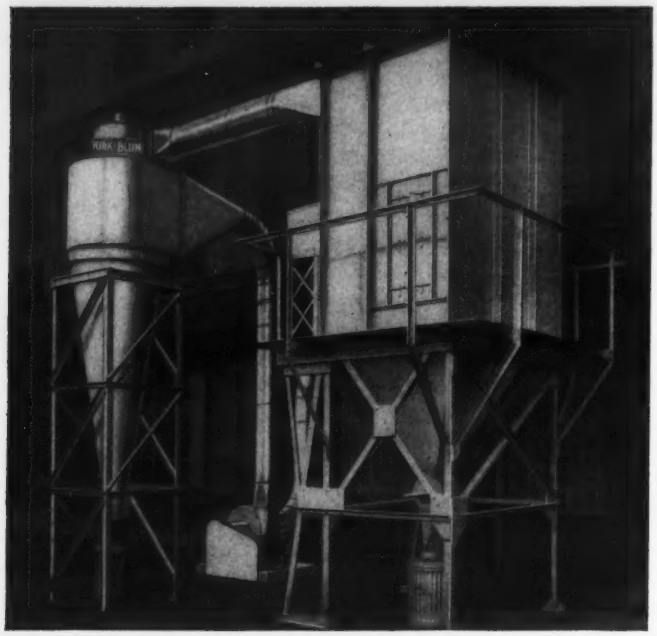
To solve any sealing problems, call your J-M Packings and Gaskets field representative. He's equipped to give you information on new products . . . engineering and design advice. For information on any J-M Packings or Gaskets write Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario.

JOHNS-MANVILLE

100 YEARS OF QUALITY PRODUCTS . . . 1858-1958

Check 1454 opposite last page

Two-stage air cleaning: high efficiency centrifugal collector (at left) plus cloth media filter.



pharmaceutical manufacturer finds

KIRK and BLUM DUST CONTROL

"just what the doctor ordered!"

To maintain rigidly controlled and conditioned plant atmosphere, air returned from cleaning operation is heated or cooled as required.

To insure, in all manufacturing steps, the purity of The Wm. S. Merrell Company's products, Kirk & Blum Dust Control Systems were installed by this well known pharmaceutical manufacturer. Dust is eliminated at its source to meet the plant's strict requirements. Since the building is air conditioned, cleaned air is tempered (warmed or cooled) before it is returned to the plant.

Whatever your problem, put it up to experts in air handling . . . KIRK & BLUM—with over 50 years' experience in Dust and Fume control. For illustrated literature, write to: The Kirk & Blum Mfg. Co., 3133 Forrer St., Cincinnati 9, Ohio.

KIRK and BLUM
DUST CONTROL

THE KIRK AND BLUM MANUFACTURING COMPANY
3133 FORRER STREET CINCINNATI 9, OHIO

Check 1455 opposite last page

NEW LITERATURE

Flexible connectors

Specifications and prices on company's bronze flexible connectors designed to convey gases or fluids at temperatures up to 400°F are provided in four-page bulletin. "UC3" Connector Bul — Universal Metal Hose Co., 2133 South Kedzie Ave., Chicago 23, Ill.

Check 1456 opposite last page.

How to cut handling costs

Manufacturer's booklet graphically explains how material handling methods are developed through the versatility of its tractor shovels. Photographs show how attachments to basic machine apply to various material handling assignments. "Seven Ways to Cut Costs" — The Frank G. Hough Co., Subs. of International Harvester Co., Seventh St., Libertyville, Ill.

Check 1457 opposite last page.

Totally enclosed motors

Construction and design features of line of totally enclosed motors with self-contained heat exchanger cooling for operation in highly contaminated atmospheres are described in manufacturer's four-page Bul 53B8904 — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 1458 opposite last page.

Methacrylonitrile report

Typical uses, properties, reactions of methacrylonitrile and of polymethacrylonitrile are set forth in eight-page report. TDR-N-103 — Eastman Chemical Products, Inc., subs. of Eastman Kodak Co., 260 Madison Ave., New York 16, New York.

Check 1459 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Photographic dosimetry

This technique provides a valuable tool for determining exposure of personnel to high-energy radiation. Booklet of 14 pages describes seven types of dosimeter films, useful exposure ranges, processing, and calibration. A bibliography on dosimeter film usage is included. Booklet A-1009a — Room n-2420-2, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Check 1460 opposite last page.

Product, process listing

Listing of products processed in manufacturer's equipment, incorporating descriptive explanations of equipment, has been prepared. It is intended to pinpoint some of the unusual applications and to suggest to user things which have been done successfully in the past. The first or "A" section covers approximately 30 materials and is available from Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 1461 opposite last page.

Thermometers

Complete line of rectangular case, filled-system thermometers is described in 56-page catalog which covers indicators, recorders, transmitters, and electric or pneumatic control instruments. Cat C60-2 — Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne and Windrim Aves., Philadelphia 44, Pa.

Check 1462 opposite last page.

Aliphatics booklet

Aliphatic chemicals which function as bacteriostats, flexible hardeners in epoxy resins, anti-stripping agents in asphalts, corrosion inhibitors, and fuel additives in petroleum products are described in 12-page booklet. "Duomeens" — Chemical Div., Armour and Co., 1355 W. 31st St., Chicago 9, Illinois.

Check 1463 opposite last page.

Data on 90° elbows

Manufacturer's data sheet provides information on short-radius 90° corrosion-resistant elbows in stainless steel, monel, nickel, and aluminum. Data sheet on 90° elbows — Welding Fittings Corp., New Castle, Pa.

Check 1464 opposite last page.

Describes gas analyzer

Detailed information on applications, features, principles of operation, and specifications of manufacturer's thermal conductivity gas analyzer is contained in four-page Bul TC-4012 — Process Instruments Division, Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, California.

Check 1465 opposite last page.

Aromatics catalog

Descriptions and general information are in 36-page price catalog of essential oils, aromatic chemicals, and flavor and perfume bases. Price Catalog, 1958 — Dodge & Olcott, Inc., 180 Varick St., New York 14, N.Y.

Check 1466 opposite last page.

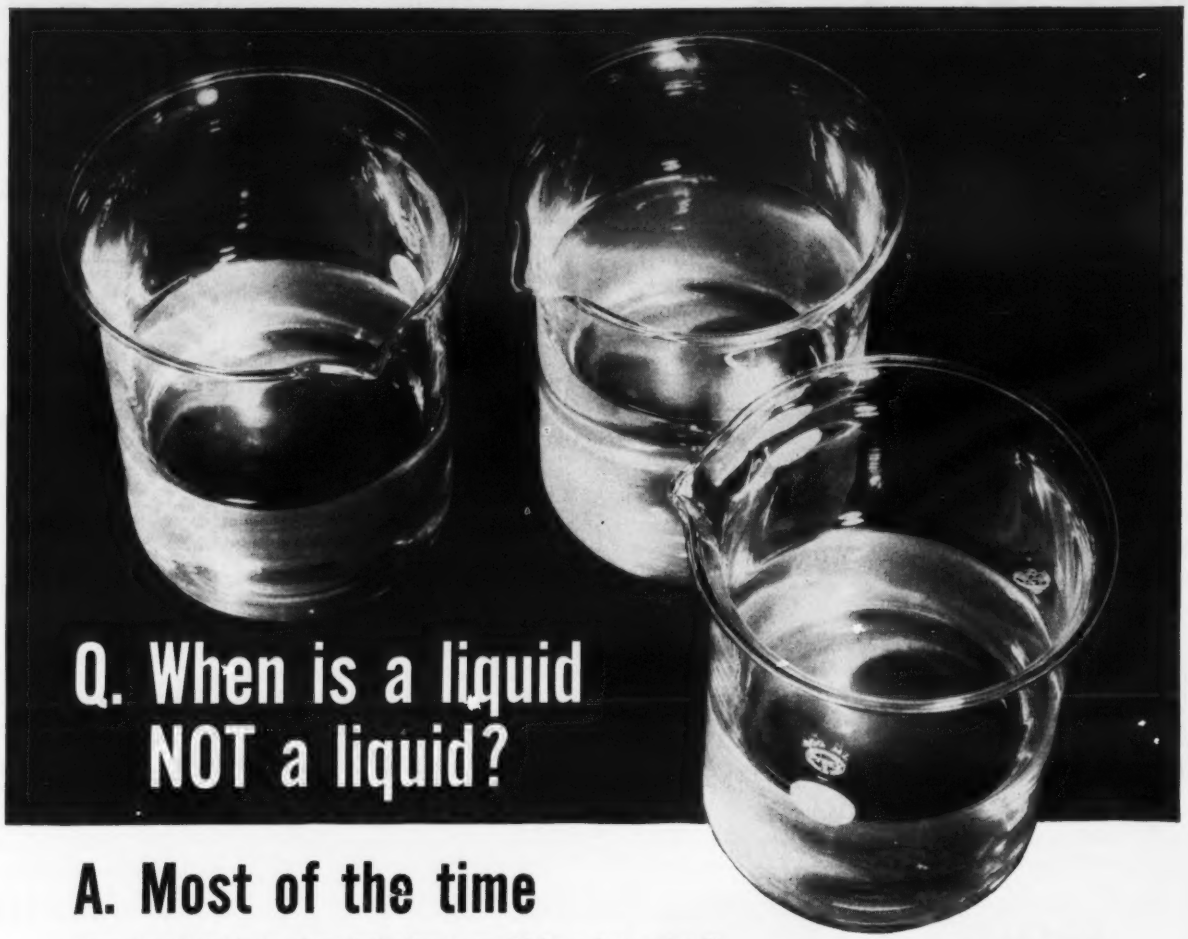
Reactor core materials

Quarterly review summarizes and evaluates current developments related to solid materials for reactor cores. To obtain "Reactor Core Materials," remit $2.00 ($2.50 foreign) per yr direct to Superintendent of Documents, U. S. Government Printing Office, Washington 25, District of Columbia.

Lists rare chemicals

Six-sheet compendium lists about 100 rare chemicals, including inorganics, metallo-organics, and organics. Rare chemicals compendium — Chemicals Procurement Co., 550 Fifth Ave., New York 36, New York.

Check 1467 opposite last page.

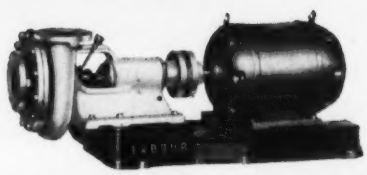


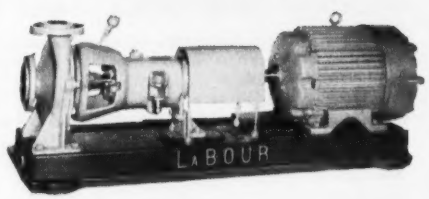
A. Most of the time

Pumping liquids in chemical plants would be a lot easier if you didn't have to pump other things, too. Gases, for instance —vaporized from the liquid by lower absolute pressure on the intake side. Or air, entering through imperfect pipe joints or entrained by an upstream process or condition. Then there are solids—sediment, crystals or just plain dirt, depending on what you are pumping and from where.

Most of the time, in pumping chemicals you've got to deal with one or more of these troublemakers. That's when you need LaBour. Open impellers with generous clearances lick the solid-particles problem. And LaBour design permits handling up to 20% air or gas mixed with the liquid—*in non-priming* pumps.

"The facts of life" must be faced in chemical plants as elsewhere. A thoughtful appraisal of your less-than-ideal situation will save you a lot of future trouble, because you'll have LaBour pumps on the job.





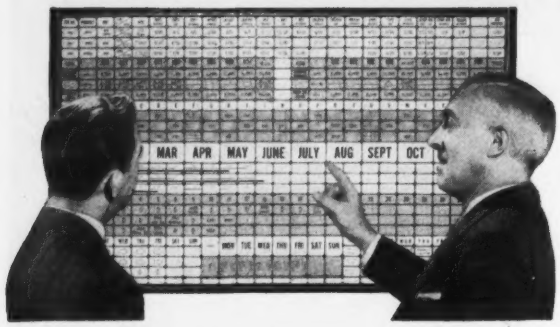
ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U.S.A.

Check 1468 opposite last page

You Get Things Done Better By Seeing What's Happening



BOARDMASTER VISUAL CONTROL

★ Gives Graphic Picture of Your Operations in Color.
★ Facts at a Glance - Saves Time and Prevents Errors.
★ A Simple, Flexible Tool - Easily Adapted to Your Needs.
★ Easy to Use. Type or Write on Cards, Snap on Board.
★ Ideal for Production, Scheduling, Sales, Inventory, Etc.
★ Compact, Attractive. Made of Metal. 250,000 in Use.

Complete Price $49.50 Including Cards

FREE 24-Page ILLUSTRATED BOOKLET AA-10 Without Obligation

GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N.Y.

Check 1469 opposite last page

PROTECT YOUR HANDS!

SILA-HAND . . . THE NEW PROTECTIVE INDUSTRIAL HAND CREAM, REALLY WORKS!

Your hands are constantly exposed to the injurious, harsh and damaging effects of solvents, acids and alkalies — protect them with SILA-HAND.

The high percentage of silicone in SILA-HAND forms a protective coating against the action of these chemicals. SILA-HAND eliminates the damaging effects to your hands and helps keep dirt and grime from penetrating the pores of your skin.

SILA-HAND also contains lanolin to help replace the natural body oils that have been dehydrated from the hands.

Don't put up with sore, rough and dried-out hands another day . . . order a supply of SILA-HAND today! Use the coupon below for fast service.

WARCO LABORATORIES
13609 So. Normandie Ave., Gardena, Calif.

Please send _____ jars of SILA-HAND at $1.75 per jar plus tax and postage to:

NAME _____

COMPANY _____

ADDRESS _____

Check 1470 opposite last page

NEW LITERATURE

Ambuling elevator — Features, specifications, and various applications of compact, demountable elevator are presented in eight-page illustrated catalog. Unit can be re-erected quickly at any work site to carry technicians and service crews to high locations for purposes of maintenance, construction, or control. Cat 852 — Hawkeye Products Corp., 1013 South State St., Syracuse 3, N. Y.

Check 1471 opposite last page.

Dust collector is said to collect over 99% of dust five microns and larger and 92% of two-micron dust. Performance, specifications, construction, and typical installations are covered in Bul 227-80 — Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa.

Check 1299 opposite last page.

An air pollution study concerning eye irritation from solar radiation of organic compounds and nitrogen dioxide is covered in 64-page report. Report discusses series of statistically designed experiments made on olefins, paraffins, ring compounds, solvents, and other organic materials. According to information obtained, in general, there was no correlation between eye irritation values and oxidant values. To obtain Report 23, "Eye Irritation From Solar Radiation of Organic Compounds and Nitrogen Dioxide", remit $3.00 direct to Air Pollution Foundation, 2556 Mission St., San Marino, Calif.

Industrial locomotives — Six important questions to ask when buying an industrial locomotive are considered in 16-page illustrated bulletin which presents specifications, advantages, and uses of manufacturer's industrial locomotive equipment. Bul GEA-6445 — Locomotive & Car Equipment Dept., General Electric Company, Erie, Pa.

Check 1472 opposite last page.

Pneumatic pressure transmitters, their principle of operation, engineering data, and installation data, are treated in four-page Bul 58-1 — Republic Flow Meters Co., Subs. of Rockwell Mfg. Company, 2240 Diversey Pkwy., Chicago 47, Ill.

Check 1473 opposite last page.

Homogenizer-mixer that provides continuous-flow mixing and high-speed high-shear homogenizing is described in detail in Eppenbach Fact Book — Eppenbach Div., Gifford-Wood Co., Dept. CP-9, Hudson, N.Y.

Check 1314 opposite last page.

STANDARD PERFORATED SCREENS

precisioneered for resistance . . .

to PRESSURE

to CLOGGING

to CORROSION

to HEAT

Precision made for on the job durability is an outstanding feature of Standard Perforated Screens. Standard's long-life factor adds economy to your processing operations, the precision perforated quality so necessary to any chemical operation involving screens . . . filtering, straining, vibrating, sizing, etc. Specify Standard Perforated Screens for increased production of better quality materials at lower cost. Choose from stock designs or Standard will perforate to your specs. Send prints for free estimate . . . at no obligation, of course.

WRITE FOR NEW, FREE PERFORATED METAL CATALOG!

STANDARD
STAMPING & PERFORATING COMPANY
3117 West 49th Place, Chicago 32, Illinois

Check 1474 opposite last page

TRENT PACKAGED CIRCULATION HEATERS

for Water, Oil, Brine, Air and Various Gases

- Water—Superheat
- Oil, Oil Burners, Heat Transfer Liquids
- Brine, Defrost Applications
- Air, to High Temperatures—Test Work
- Gases, Hydrogen, Nitrogen, etc.

The unique design of TRENT "Packaged" Circulation Heaters *eliminates* return bends in the heating tubes . . . to assure free, uninterrupted flow of liquid through the heater—at the *exact* velocity you require! This means faster, more efficient heating for all types of process equipment.

TRENT SOH Oil Circulation Heater
TRENT SWH Water Circulation Heater
furnished fully equipped with

- All-Welded Companion Pipe Assemblies with Insulation
- Indicating or Non-Indicating Thermostats for High Temperatures
- Rugged Outer Casings with Mounting Tabs
- TRENT Multi-Tube Flanged Immersion Heater Unit
- Mounted 6" square Terminal Box

Let a TRENT engineer determine the TRENT "Packaged" Circulation Heater best suited for your operation . . . or custom-engineer one to meet your special wattage and voltage requirements.

TREN INC
Electrically Heated Industrial Equipment
235 LEVERINGTON AVE., PHILA 27, PA
In Canada Supreme Power Supplies Limited, Toronto 14

Check 1475 opposite last page

Fabrication of stainless steel is subject of 386-page hard-covered book that includes valuable information on types of stainless and corrosion resistance. Containing over 120 charts and graphs, 140 photographs, and approximately 200 diagrams, the book's nine chapters go into detail on every common method and practice for successful fabrication of this metal. "Stainless Steel Fabrication" — Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

Check 1476 opposite last page.

Pellet mills — The facts on equipment which manufacturer reports will provide economical pelleting are presented in Bul 182-A — Sprout-Waldron & Co., Inc., Muncy, Pa.

Check 1494 opposite last page.

Continuous titrating system for slurry concentrations is described in four-page data sheet which covers titrator in detail and includes schematic drawing and list of equipment with typical specifications. Data Sheet A-58-2 — Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pennsylvania.

Check 1477 opposite last page.

Can packager — Bulletin of four pages describes operating features of can-line packaging equipment which automatically feeds, weighfills, packs, and ejects one-half or one-lb cans of dry granular, crystalline, or powdered materials. Bul 306 — B. F. Gump Company, 1325 South Cicero Ave., Chicago 50, Ill.

Check 1478 opposite last page.

Automatic sequence control that will activate up to 30 pieces of equipment in one cycle is detailed in four-page, illustrated Data Sheet EEa — The Allen-Sherman-Hoff Company, 257 E. Lancaster Ave., Wynnewood, Pa.

Check 1217 opposite last page.

Digital indicator catalog of six pages describes precision, in-line instrument which accepts a variable frequency AC input—such as produced by turbine-type flow meters, tachometers, and other primaries—and converts it to a 5-digit indication, accurate to within 1 frequency count. Included are block diagram, three line drawings of component parts, and chart of test point wave forms. Cat 51-1800 —Fischer & Porter Co., 627 Jacksonville Rd., Hatboro, Pa.

Check 1479 opposite last page.

Teflon bellows is feature of rotating mechanical seal for corrosive service described and specified in Cat T-57 — The Belmont Packing and Rubber Company, Butler & Sepviva Sts., Philadelphia 37, Pa.

Check 1110 opposite last page.

Hand truck selector chart is designed to simplify selection of hand lift trucks offered by manufacturer. Illustrated easy-to-follow chart can be attached to wall or bulletin board for ready reference. Circular 26B — Lewis-Shepard Products, Inc., Dept. R8-12, 125 Walnut St., Watertown 72, Massachusetts.

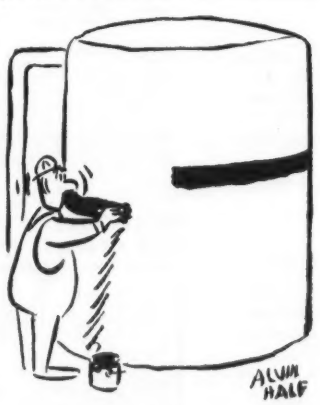
Check 1480 opposite last page.

USAF materials r&d abstracts of technical reports and notes written from July 1956 through June 1957 are contained in publication recently released to industry. Two hundred and 70 reports appearing during 12-month period are abstracted. They cover research in adhesives, metallurgy, petroleum products, plastics, rubber, and other areas.

Contractor, investigator, and numerical indexes of all technical reports issued from March 1923 through June 1957 are included. To obtain Report PB 111648S3 "A Review of the Air Force Materials Research and Development Program", remit $4.75 direct to Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

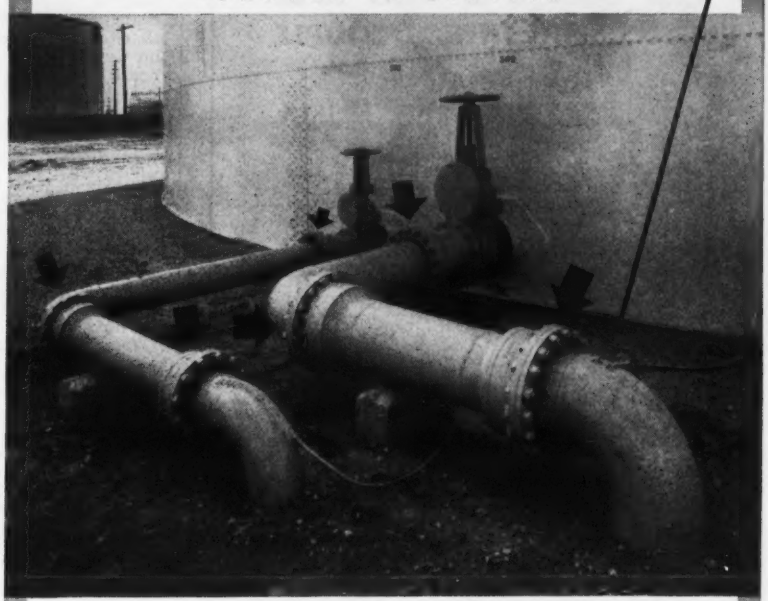
Pumps any chemical that can be forced through a pipe . . . is statement made by manufacturer of this chemical pump. Details are contained in Moyno Pump Bul 30-CP — Robbins & Myers, Inc., Springfield, Ohio.

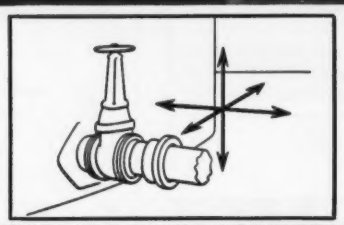
Check 1250 opposite last page.



Unlimited Flexibility!

—PROVEN IN SERVICE





Allows 8-Way Movement!

Freedom of movement in any direction is readily possible with these *ball joint connections* of 12" pipe (right) and 8" pipe (left) to 80,203 bbl. tank shown in above photo. (Photo: SHELL OIL COMPANY, Dominguez Refinery, Wilmington, Calif.)

Barco Ball Joints—

provide complete protection against

FIRE, EARTH SHOCK, TANK SETTLING

The rapidly increasing use of Barco's new large size Flexible Ball Joints in California, and other locations, is significant for several key reasons:

1. **Fire-Safe. The joints have passed rigid fire and water spray tests.**
2. **Unlimited flexibility and movement.**
3. **Long service life without maintenance.**
4. **Joints insulate against electrolysis as well as provide movement in all planes.**

Such installations protect piping, valves, and tanks from earth movements, shifts, shocks, and earthquakes. They allow for *tank settling* or *tilting* as well as for *thermal expansion* or *contraction of piping* leading to tanks without creating strain. In case of fire, the joints are "fire safe."

For detailed information, WRITE FOR CATALOG 215B. Joints available in steel with flanged or welding ends. 15° angular flex.

PRODUCTS BACKED BY EXPERIENCE
BARCO
ANNIVERSARY
1908 50TH 1958

BARCO MANUFACTURING CO.

537K Hough Street • Barrington, Illinois

The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Rotary Joints

In Canada: The Holden Co., Ltd., Montreal

Check 1481 opposite last page

Adjustable
conax®
PIPE CLAMP THERMOCOUPLE

for accurately reading outside pipe temperatures

advantages

- Used wherever immersion thermocouples are impractical or undesirable
- Used where extreme corrosion and erosion are problems
- Provides temperature readings on alloy, plastic or glass pipes that are not easily entered
- High pressure lines unbroken—a safety feature
- Installation and service without interrupting operations or flow
- Permits checking other temperature measuring devices
- Checks effectiveness of insulation
- Multiple units readily used for obtaining temperature gradients
- Installed in less than a minute

Thermocouples available in Copper-Constantan for low temperatures or Iron — Constantan and Chromel—Alumel up to 1000° F.

WRITE FOR CONAX DATA BOOK SHOWING COMPLETE LINE OF THERMOCOUPLE ASSEMBLIES AND PRESSURE SEALING GLANDS.

conax *corporation*
2314 Walden Ave., Buffalo 25, N. Y.

Check 1482 opposite last page

Now—
a really effective
FLARELESS FITTING
for connecting
STAINLESS STEEL TUBING
IMPERIAL
HI-SEAL™

The Stainless Steel Tube Fitting that—

- Provides foolproof assembly
- Makes a butt joint
- Eliminates need to spring tubing
- Provides closer tube bends
- Withstands higher pressures
- Is available in stainless steel (316), steel or brass
- Meets J.I.C. and A.S.M.E. standards; listed by U.L.
- Write for Bulletin 3061

The most important advance in tube fittings in 20 years!

THE IMPERIAL BRASS MFG. CO.
6300 West Howard Street
Chicago 48, Illinois, Dept. CPR98
In Canada: 18 Hook Ave., Toronto, Ont.

IMPERIAL
Emblem of Quality
Industry's most complete line of tube fittings and tubing tools

Check 1483 opposite last page

NEW LITERATURE

"A Guide to Better Closures" is title of 16-page booklet to aid evaluation of methods being used to effect economies and stepped-up production in closure of fiberboard boxes. Section on wire stitching for all kinds of fiberboard boxes is included. Acme Steel Products Div., Acme Steel Co., 135th and Perry Avenue, Chicago 27, Ill.

Check 1484 opposite last page.

Conveyor belt idler that is said to resist dust, abrasion, corrosion, and material build-up is detailed in Bul 24-80 — Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa.

Check 1264 opposite last page.

Spray drying process advantages are detailed in eight-page illustrated bulletin that describes spray dryer installations and outlines features of process. Bul SW-401 — Swenson Evaporator Company, Div. of Whiting Corp., 157th and Lathrop Ave., Harvey, Ill.

Check 1485 opposite last page.

Wire cloth — Information on bulk or fabricated wire cloth is contained in 94-page catalog and stock list that gives full range available and describes fabrication facilities. Useful metallurgical data are included. Wire cloth cat — The Cambridge Wire Cloth Co., Dept. F, Cambridge 9, Md.

Check 1313 opposite last page.

Temperature and pressure measurement glossary of terms provides up-to-date reference guide to terms frequently used in this field. Booklet of 20 pages is completely illustrated with drawings and graphs and comes in handy pocket size. "Temperature and Pressure Measurement Glossary" — Trans-Sonics, Inc., Burlington, Massachusetts.

Check 1486 opposite last page.

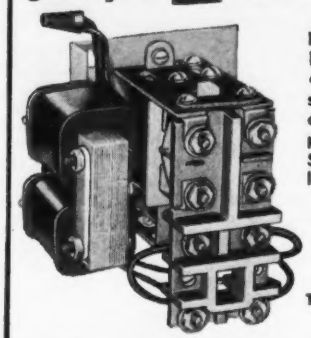
Tank-weighing packaged system is described in bulletin that provides easy-to-use method of figuring your system costs. Bul 582 — The A. H. Emery Company, Pine St., New Canaan, Conn.

Check 1164 opposite last page.

Safety-relief valves — Detailed information for quick selection and sizing of all nozzle safety-relief valves produced by manufacturer is included in 44-page specifications Cat 118 — Farris Engineering Corporation, 505 Commercial Ave., Palisades Park, N. J.

Check 1487 opposite last page.

WARRICK Floatless Electrode Type
LIQUID LEVEL CONTROLS . . .
give you all these advantages!



No moving parts in the liquid • Easy to install • No adjustments necessary • Unaffected by acids or caustics • Unaffected by pressure or temperature • Standard 2&3 pole units listed by U/L

Write for 32-page Catalog which gives complete specifications

Two pole control shown at left

YOU CAN USE OUR CONTROLS FOR:

- Single & multiple pumps
- Motor & solenoid valves
- High & low cutoffs & alarms
- Sewage & waterworks
- Chemical Industries
- Food & Dairy Industries
- OEM applications

Special controls to custom requirements

CHARLES F. WARRICK CO.
1964 W. Eleven Mile Road, Berkley, Michigan
Dep't 9 Telephone JOrdan 4-6667

Check 1488 opposite last page

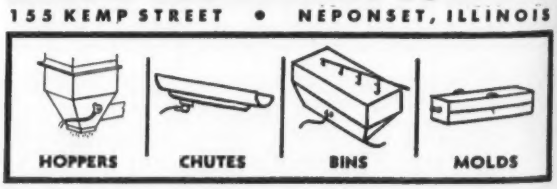
VIBROLATOR®
"WORLD'S QUIETEST VIBRATORS"
MOVES MATERIALS

This vibration inducer has only one moving part — a rolling ball. Works perfectly on wet or dirty air. Need no lubricator. Guaranteed self-starting always. Operates continuously in very hot locations. Absolutely spark-free for hazardous jobs.

The Vibrolator moves material out of hoppers, down chutes and through screens. Compacts concrete in forms or granulars in boxes or drums.

Available in 14 sizes, priced from $12 to $150, "pocket-watch" size to new 28 lb. UCV-64, shown here. Never harms equipment on which it is mounted. Write for catalog today.

MARTIN ENGINEERING COMPANY
155 KEMP STREET • NEPONSET, ILLINOIS



Check 1489 opposite last page

for uniform results
in . . . BAKING
DRYING
CURING
DEHYDRATING
select
YOUNG BROTHERS
OVENS and DRYERS
designed and built
for individual product
and process requirements
Batch and Conveyor Types up to 1000° F
Gas, Electric, Steam, Oil — Radio Frequency Power
Write for Bulletin 157
YOUNG BROTHERS CO.
1825 Columbus Road • Cleveland 13, Ohio
Over 60 years of service

Check 1490 opposite last page

EFFECTIVE
TANK
CLEANING

New bulletin describes Sellers RotorJet, "World's newest, most effective tank cleaner".

Bulletin describes how Sellers Rotor Jet completely cleans tanks, tank cars, tank trucks in far less time—regardless of size or shape. Also tells in detail of automatic operation and varied applications. Specifications include pressures, capacities, vital data.

SELLERS Injector CORPORATION
1600U Hamilton St., Philadelphia 30, Pa.
Since 1848

FREE! Write today for your copy of Bulletin 432.

Check 1491 opposite last page

Modern Instrumentation

From page 109

operators are usually required and may assume control of less critical functions.

"If the engineer goes to the limit in instrumentation to reduce operating labor, he may find that elimination of the last operator has necessitated addition of a skilled instrument maintenance man at higher cost. The basic problem is to provide a control system with a sufficient degree of automation to satisfy the plant operating group within a cost that will satisfy management."

Incoming President of the Instrument Society of America, Assistant Chief Engineer H. C. Frost of Corn Products Refining Company says:

"At Corn Products we are constantly striving to find ways to assure the most effective use of instrumentation at lowest investment and operating costs.

"To do this we obtain as much basic information as is possible on process variables and their relation to the product we desire to produce. Through close collaboration of process design, mechanical and instrumentation engineers, we design the process installation to provide *minimum* investment consistent with maintaining maximum yields, product to specifications, and minimum operating cost.

"All our operating men will have followed the design phase. And we work closely with them in the initial operation phase when the design engineers are working to provide the predicted results.

"Thorough training of operators and maintenance personnel both during construction and the initial operating phases helps to assure that continuing good results will be achieved."

Most Difficult Job

Developing the necessary coordination and cooperation throughout the organization is frequently the instrument engineer's most difficult job.

Since today's chemical plants are the result of many groups of engineers expressing their interests, the instru-

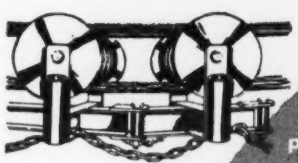
Specialized
Die-Cutting and Gaskets

- More than 35 years experience in die-cutting non-metallic materials.
- We are equipped to slit rubber slabs up to 12" thick — or, to die-cut materials as thin as .001" onion skin shim paper.
- Difficult adhesive coated, or impregnated materials are easily handled through our unique cutting process.
- Materials handled and stocked include paper, asbestos, fibre, rubber, cork, felt, synthetics and many miscellaneous materials.
- All steel rule dies are made in our own plant.

Ask about our technical and consulting service.

Rhopac, Inc.
3439 Cleveland Street, Skokie, Illinois
Manufacturers of mechanical packings, industrial and boiler gaskets, radio speaker gaskets, steel rule dies, flexible packing hooks.

Check 1492 opposite last page



You can cut loading costs in half on packaged or bagged items. Let us show you how—fill in and mail the section below:

LEARN HOW TO SAVE MANPOWER
IN LOADING BOX CARS AND TRUCKS

We pack _____ (material)
NAME.....
FIRM.....
ADDRESS.....

POWER-CURVE CONVEYOR CO.
2185 South Jason Street, Denver 23, Colorado

Check 1493 opposite last page

SPROUT-WALDRON
PELLET MILLS

Pelleting minimizes dusting; helps preserve original moisture content, chemical analysis and other properties; turns difficult to handle powders into free-flowing material which is easy to dry, cool, bin, sack and package; reduces storage space; adds sales appeal. For economical pelleting, specify a S-W Pellet Ace. Bulletin 182-A gives the facts.

SPROUT-WALDRON
Manufacturing Engineers Since 1866
MUNCY, PA.
EQUIPMENT FOR SIZE REDUCTION—MIXING & BLENDING — BULK MATERIALS HANDLING — PELLETING & CUBING — PRODUCT CLASSIFICATION

EP/101

Check 1494 opposite last page

- **Corrosion-Resistant**
- **Meters Acids, Alkalies, Slurries, Gases**
- **Extremely Short Length**
- **Very Low Head Loss**

Request Bulletin 115-R1 describing Model DFT-PI Dall Flow Tube — the new, low cost, low-loss differential producer. Rugged insert-type unit constructed of epoxy or polyester resins reinforced with fiberglas — with corrosion-resistant metallic throat-ring and flange.

Write to **Builders-Providence, Inc., 387 Harris Avenue, Providence 1, Rhode Island.**

BUILDERS-PROVIDENCE
DIVISION OF
B-I-F INDUSTRIES
METERS FEEDERS CONTROLS

Check 1495 opposite last page

Modern Instrumentation

From preceding page

ment engineer must work with many groups in their specialized engineering fields.

Instrument engineer W. A. Crawford of Du Pont's Engineering Department lists six or more groups: "The instrument engineer may work with the research chemist during the pilot plant operation, the plant operating personnel during control and panel board designs, and plant instrument maintenance personnel during selection of equipment.

"He also has to work directly with process engineers, electrical engineers, structural and building specialists to coordinate a complete design.

"He must direct the work of mathematicians who now accomplish extensive investigations into both economics and dynamic stability of processes. He must be conversant with operation of eletronic computers, both analog and digital, used in these analyses."

Strong Liaison Efforts

How can there be any improvement made in the project's coordination and cooperation? Nantz of Goodrich says that by strengthening liaison efforts between design and development departments during the development stages, the needed improvements can usually be made.

"Excellent results have also been obtained by assigning a development man and a production man to the engineering design group during the project's duration.

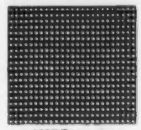
"A production man assigned to the construction phase and reporting to the project engineer has also proven valuable. At time of start-up, the development man assigned to design, as a design man, and the two production men mentioned move right into the unit and assist in actual start-up."

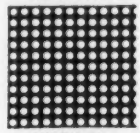
Carl Hoyer of Chemstrand Corporation says an interesting approach to improving cooperation among engineers is to increase the men's experience and abilities by new job assignments outside their specialty. "Bring operating per-

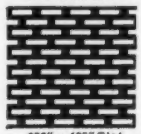
To page 234

H&K Perforated Screens

for Grading Sieving Dewatering Filtering Straining • Sterilizing and Tote Baskets


.020" Diameter


.045" Diameter


.028" x .125" Slot

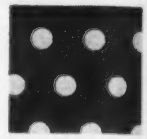
FIND NEAREST H&K AGENT IN THE 'Yellow Pages'

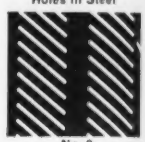
Listed Under "Perforated Metals"

H&K perforated screens are furnished, to customer order, with holes accurate and uniform in size, shape and spacing. The screen resists blinding as burr-free holes are slightly larger at the bottom. H&K perforated screens can be furnished with margins or unperforated areas in practically any material desired.

H&K specializes in the perforating of stainless steel, monel and other corrosion-resistant alloys.

Contact either H&K office or an H&K agent. Let us work with you on your perforated screen requirements.


Tapered Round Holes in Steel


No. 3 Diagonal Slot

Write for H&K General Catalog

THE **Harrington & King** PERFORATING CO. INC.

Chicago Office and Warehouse 5636 Fillmore St., Chicago 44
New York Office and Warehouse 110 Liberty St., New York, N. Y.

Check 1496 opposite last page

QUALITY IS BUILT-IN . . . QUALITY IS PROTECTED
Republic "Dekoron-Coated" E.M.T.

Republic ELECTRUNITE® "Dekoron®-Coated" E.M.T., in service for nearly seven years at the Charmin Paper Products Company, has outlasted standard conduit ten to one. A tough coating of polyethylene encases lightweight, strong ELECTRUNITE E.M.T. in an end-to-end armor that is impervious to corrosive atmospheres. Protect your electrical raceways with Republic "Dekoron-Coated" E.M.T.

See your electrical distributor for free folder filled with Republic ELECTRUNITE "Dekoron-Coated" E.M.T. facts and data. Or, write direct today.

REPUBLIC STEEL
STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8, Ohio

Check 1497 opposite last page

ADVERTISERS in this issue

A

Allen-Bradley Co. 71
Allen-Sherman-Hoff Company, The 142
Allied Chemical Corporation, Baker & Adamson, General Chemical Division ..... 2nd Cover
Allied Chemical Corporation, National Aniline Division 101
Allied Metal Hose Company 153
Allied Radio 49
Allis-Chalmers, General Products Division 73, 75
Allis-Chalmers, Industrial Equipment Division 147
Allis Co., The Louis 182B
Alloy Products Corp. 177
Alloy Steel Products Co., Inc. 182A
Aluminum Company of America 212
Aluminum Company of America, Chemicals Division 151
Amercoat Corporation ..... 4th Cover
American Brass Company, The 179
American Chain & Cable, R-P&C Valve Division 217
American Hard Rubber Company, Division of Amerace Corporation 176
American Machine & Metals, Inc., Filtration Engineers Division 181
American Machine & Metals, Inc., Niagara Filters Division 202
American Machine & Metals, Inc., Tolhurst Centrifugals Division 203
American Potash & Chemical Corporation, Lindsay Chemical Division 8
American Sterilizer, Scientific Division 109
Ampco Metal, Inc. 197
Anders Lykens Corp. 88
Anderson Company, The V. D., Division of International Basic Economy Corporation 37
Annin Company, The, Division of The Annin Corporation 130-131
Armstrong Machine Works 111
Aurora Pump Division, The New York Air Brake Company 234

B

B/W Controller Corporation 126
Babbitt Steam Specialty Co. 74
Babcock & Wilcox Company, The, Tubular Products Division 61
Baker & Adamson, General Chemical Division, Allied Chemical Corporation ..... 2nd Cover
Barber-Colman Company 140
Barco Manufacturing Co. 227
Bartlett & Snow Co., The C. O., Material Handling and Processing Division ..... 3rd Cover
Barton Instrument Corporation 127
Becco Chemical Division, Food Machinery and Chemical Corporation 138
Belmont Packing and Rubber Company, The 82
Black, Sivalls & Bryson, Inc., Safety Head Division 83
Bristol Company, The 128-129
Brooks Rotameter Company 126
Brush Instruments, Division of Clevite Corporation 116
Buffalo Pumps, Division of Buffalo Forge Co. 68
Buflovak Equipment Division, Blaw-Knox Company 63
Builders-Providence, Inc., Division of B-I-F Industries, Inc. 230

C

Callery Chemical Company 49, 77, 103
Cambridge Instrument Co., Inc. 78
Cambridge Wire Cloth Co., The 184
Cardox Corporation 80
Case Co., J. I. 215
Ceilcote Company, Inc., The 170
Celanese Corporation of America, Chemical Division 97
Celluplastic Corporation 148
Chemical & Power Products, Inc. 87
Chempump Corporation 90
Chicago and North Western Railway 5
Chicago Steel Tank Company, division of U.S. Industries, Inc. 46
Chicago-Wilcox Mfg. Co. 214
Colonial Plastics Mfg. Co., Subsidiary, of The Van Dorn Iron Works Co. 76
Conax Corporation 228
Conoflow Corporation, Subsidiary of Walworth 114
Continental Can Company 161
Cook Company, C. Lee, Division of Dover Corporation 174
Cooper Alloy Corporation, Valve & Fitting Division 193
Coppus Engineering Corporation 218
Crane Co. 85, 86
Crane Packing Company 150
Cyclotherm Division, National-U.S. Radiator Corp. 192

D

Darling Valve & Manufacturing Co. 219
Day Company, The 192
Deming Company, The 222
Diamond Crystal Salt Co. 94-95
Dings Magnetic Separator Co. 188
Dodge & Olcott, Inc. 22
Doré Co., John L. 34
Dorr-Oliver, Incorporated 187
Dow Chemical Company, The 40, 57
Dow Corning Corporation 96
Du Pont de Nemours & Co. (Inc.), E. I., Polychemicals Dept. 35
Durametallic Corporation 64

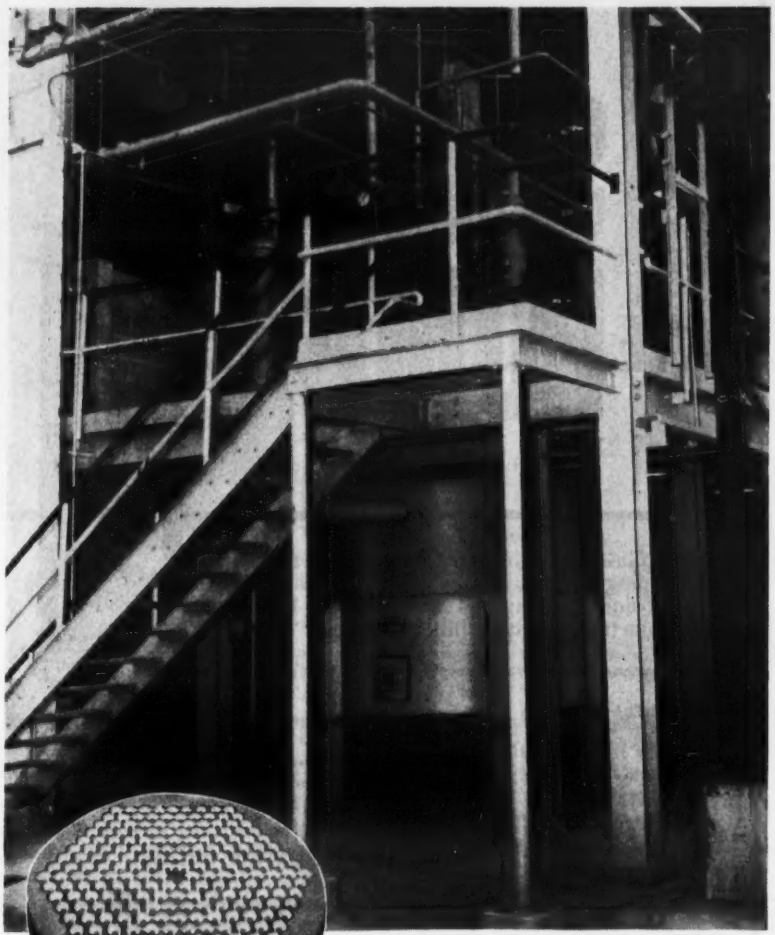
E

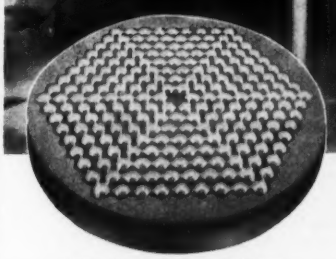
Eastern Industries, Inc. 187
Eco Engineering Co. 189
Eimco Corporation, The 143
Electric Steel Foundry Company 62A-B
Elgin Softener Corporation 216
Ellis & Sons, Inc., George D. 219
Emery Company, The A. H. 108
Eriez Manufacturing Company 24, 146, 213
Ervale Corporation 200
Essex Conveyors, Inc. 167
Exact Weight Scale Co., The 160

F

Fairbanks, Morse & Co. 69
Falcon Alarm Co., Inc. 196
Fansteel Metallurgical Corporation, Chemical Equipment Division 48
Ferguson Co., J. L. 81
Filtration Engineers, American Machine and Metals, Inc. 181
Flexitallic Gasket Co. 169
Flexrock Company 234
Flowline Corp. 3

Economy . . . Speed . . . Quality in BATCH PROCESSING





Duradiant Burner Setting

Plant Manager, Monsanto Chemical Co., Nitro, W. Va. reports: "This furnace is used to heat a 1,000-gal vessel and contents to an elevated temperature and to maintain this temperature for a predetermined period of time."

. . . with Selas Duradiant® Heating

Control in uniformity of heat application and adherence to critical programming requirements are important features of Selas Duradiant heating for batch cooking chemicals, oils, resins, varnishes, inks.

Fast, radiant gas heating, rapid burner response and turndown ratios of 15:1 or more, make Selas settings as versatile as they are controllable . . . enable them to meet any time-temperature cycle within ±2° F, and duplicate it, batch after batch.

Efficient, low-cost Duradiant enclosed or open settings are steel-encased, shipped with all refractory in place for simple installation. "Packaged" equipment may include shop-assembled piping and complete, automatic control instrumentation.

Send for bulletin "Heat Processing Batch Liquids." Address Dept. 159.
Duradiant is a registered trade name of Selas Corporation of America

SELAS CORPORATION OF AMERICA DRESHER, PENNSYLVANIA — *Heat and Fluid Processing Engineers* — DEVELOPMENT • DESIGN • CONSTRUCTION

Check 1498 opposite last page

YOU **SUMP** IT!

WE **PUMP** IT!

The Galigher Company's vast experience in pumping and their knowledge of abrasion and corrosion proofing has enabled them to solve serious material handling problems.

U.S PATENT NO 2,808,782

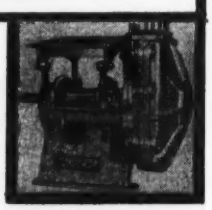
PROBLEM

To handle an abrasive and corrosive slurry containing phosphoric acid, sulfuric acid, kerosene, amines and chlorides in the solvent extraction process at uranium ore concentration mills.

SOLUTION:

Acidproofiing the Galigher Sump Pump with a protective coat of POLYVINYL CHLORIDE (PVC).

RESULTS: Outstanding success under these extreme conditions resulted in a completely satisfactory pumping operation. Therefore, similar Galigher Sump Pumps have been specified for use in other uranium mills.



Galigher Sump Pumps are also available in the following materials of construction:

- Rubber Covered
- Neoprene Covered
- Hypalon Covered
- Hard Iron
- Stainless Steel
- Ni-Hard

THE VACSEAL PUMP

Precision engineered for rugged use. Exclusive impeller design eliminates gland water.

BULLETINS ON REQUEST

Distributors in Industrial centers of U.S. and Foreign Countries.

LEADERS IN EXPERIENCE AND SERVICE

the GALIGHER co.

CONSULTATION • PLANT DESIGN • CORROSION ENGINEERING

HOME OFFICE: 545-585 W 8th South P O Box 209 Salt Lake City 10 Utah

EASTERN OFFICE: 921 Bergen Ave (Room 1128) Jersey City 6, New Jersey

GALIGHER PRODUCTS: AGITAIR® Flotation Machine, VACSEAL Pump, Geary-Jennings Sampler, Acid-proof Sump Pump, Geary Reagent Feeder, Laboratory AGITAIR® Flotation Machine, Laboratory Pressure Filter, Laboratory Ball Mill, Rubber Lined and Covered Products, Plastic Fabrication.

SP508

Check 1499 opposite last page

Foote Bros. Gear and Machine Corporation 198
Foster Co., Benjamin, Division of Amchem Products, Inc. 58
Foxboro Company, The 15
Fritzsche Brothers, Inc. 104

G

Galigher Company, The 232
Gallaher Company, The 194
Garlock Packing Company, The 55
Gaylord Container Corporation, Division of Crown Zellerbach Corporation 159
General American Transportation Corporation, Louisville Dryer Division .. 72
General Chemical Division, Baker & Adamson, Allied Chemical Corporation ..... 2nd Cover
Gifford-Wood Co., Eppenbach Div. 184
Girdler Process Equipment Division, Chemetron Corporation 50
Glas-Col Apparatus Company 110
Glascote Products, Inc., A Subsidiary of A. O. Smith Corporation 172-173
Goodrich Chemical Company, B. F. 45
Goodrich Industrial Products Co., B. F. 53
Goslin-Birmingham Manufacturing Co., Inc. 56
Goulds Pumps, Inc. 191
Graphic Systems 226
Gray Company, Inc. 148
Great Lakes Carbon Corporation, Dicalite Department 102
Grinnell Company, Inc. 7

H

Hall Co., The C. P. 16
Hamer Valves, Inc. 214
Harrington & King Perforating Co., Inc., The 230
Harrisburg Steel Co., Division of Harsco Corporation 66
Harshaw Chemical Co., The 26
Heil Process Equipment Corporation 178
Henszey Company 194
Hercules Filter Corp. 59
Hercules Powder Company Incorporated, Cellulose Products Department 11
Heyl & Patterson Inc. 153, 185, 213
Hitemp Wires, Inc. 135
Hills-McCanna Company 10
Hoke Incorporated 84
Homestead Valve Manufacturing Company 25
Hough Co., The Frank G., Subsidiary International Harvester Company 162-163
Howe Scale Company, The, A Subsidiary of Safety Industries, Inc. 166

I

Illinois Testing Laboratories, Inc. 54
Imperial Brass Mfg. Co., The 228
Industrial Filter & Pump Mfg. Co. 149
Infilco Incorporated 84, 208
Inland Steel Container Company, Member of The Inland Steel Family 158A-B
International Boiler Works Co., The 121
International Nickel Company, Inc., The, Bayonne Works 201
Irving Subway Grating Co., Inc. 66

J

Jabsco Pump Company 196
Jelliff Manufacturing Corporation, The C. O. 208
Jo-Bell Products, Inc. 17
Johns-Manville 223
Johnson Corporation, The 220
Joy Manufacturing Company 180
Joy Mfg. Co., Limberoller Div. 166
Justrite Mfg. Co. 200

K

Kendall Company, The, Polyken Sales Division 171
Kieley & Mueller, Incorporated 119
King Engineering Corp. 126
Kirk and Blum Manufacturing Company, The 224
Knox Porcelain Corporation 185
Kuhns Brothers Company, The 79

L

LaBour Company, Inc., The 225
Lapp Insulator Co., Inc., Process Equipment Division 9
Lawrence Pumps Inc. 208
Layne & Bowler Pump Company 4
Lee Metal Products Co., Inc. 38
Leslie Co. 106
Lift Trucks, Inc. 167
LimiTorque Corporation 133
Lindsay Chemical Division, American Potash & Chemical Corporation 8
Link-Belt Company 20, 164
Liquidometer Corporation., The 234
Lithcote Corporation 175
Louisville Dryer Division, General American Transportation Corporation 72
Lumenite Electronic Co. 132

M

Magline, Inc. 234
Manton-Gaulin Manufacturing Co., Inc. 204
Markal Company, The 127
Marotta Valve Corporation 148
Marsh Instrument Co., Sales Affiliate of Jas. P. Marsh Corp. 126
Martin Engineering Company 228
Marvel Industries, Inc. 167
Mason Neilan, Division of Worthington Corporation 122-123
Master Builders Co., The, Division of American-Marietta Company 214
Mathieson Chemicals 99, 105
Mechanical Products Corporation 218
Metallizing Engineering Co., Inc. 176
Metal Textile Corp. 64
Metal & Thermit Corporation 168
Microcard Corporation 60
Midwest Piping Company, Inc. 134
Mojonnier Bros. Co. 47
Molded Fiberglass Tray Co. 78
Monsanto Chemical Company, Organic Chemicals Division 93
Moore & Company, Samuel, Dekoron Products Division 125
Morehouse-Cowles, Inc. 67
Mortell Company, J. W. 168
Multi-Metal Wire Cloth Co., Inc. 210

N

Nagle Pumps, Inc. 64
Narda Ultrasonics Corporation, The, Subsidiary of the Narda Microwave Corporation 195
National Aniline Division, Allied Chemical Corporation 101
National Distillers and Chemical Corporation, U.S. Industrial Chemicals Co. Division 86A-B
National Drying Machinery Company .. 190
Neptune Meter Company 112
Niagara Blower Company 74, 188
Niagara Filters Division, American Machine and Metals, Inc. 202
Nichols Engineering & Research Corp., Nerco-Niro Spray Dryer Div'n. 182
Norton Company, Electro-Chemical Divison 89

O

O T M Corporation 43
Okadee Company 222
Olin Mathieson Chemical Corporation, Industrial Chemicals 99
Olin Mathieson Chemical Corporation, Organic Chemicals 103
Oxy-Catalyst, Inc. 104

P

Pacific Transducer Corp. 60
Parks-Cramer Company 60
Peabody Engineering Corporation 197
Pennsalt Chemicals Corporation 146

Pennsylvania Fluorocarbon Co., Inc. 194
Pennsylvania Pump and Compressor Co. 221
Petrometer Corporation 132
Philadelphia Gear Corporation 133
Pittsburgh Coke & Chemical Co., Activated Carbon Division 100
Polish Embassy 104
Powell Company, The Wm. 199
Power-Curve Conveyor Co. 229
Pressed Steel Tank Company 233
Protective Lining Corporation 163
Puget Sound Fabricators, Inc. 186
Putman Publishing Company 127, 206

Q

Quickdraft Corporation 219

R

R-P&C Valve Division, American Chain and Cable 217
Raybestos-Manhattan, Inc., Manhattan Rubber Division 207
Raybestos-Manhattan, Inc., Packing Division 47
Raybestos-Manhattan, Inc., Plastics Products Division 18
Republic Steel, Steel and Tubes Division 230
Resistoflex Corporation 39
Rhopac, Inc. 229
Richardson Scale Company 22
Ridge Tool Company, The 78
Robbins & Myers, Inc. 158
Rockwell Company, W. S. 77
Rockwell Manufacturing Co. 139
Ross & Son Company, Inc., Charles 206

S

Safety Industries, Inc., Entoleter Division 16
Saran Lined Pipe Company 57
Sarco Company, Inc. 23
Selas Corporation of America 231
Sellers Injector Corporation 229
Sel-Rex Corporation, Rectifier Division 17
Shriver & Company, Inc. T. 183
Sigmamotor, Inc. 152
Simon-Carter Co. 204
Simpson Co., The Orville 186
Sindar Corporation 103
Sly Manufacturing Co., The W. W. 41
Snap-Tite, Inc. 12
Southwestern Engineering Company 218
Sperry & Company, D. R. 33
Spraying Systems Co. 186
Sprout-Waldron 230
Square D Company 200
Standard Oil Company 98
Standard Stamping & Perforating Company 226
Stearns Magnetic Products, A Division of The Indiana Steel Products Company 196
Steel and Tubes Division, Republic Steel 230
Stephens-Adamson Mfg. Co. 19
Strahman Valves, Inc. 74
Strong, Carlisle & Hammond 216
Sturtevant Mill Co. 48
Swartwout Company, The 141
Swenson Evaporator Co., A Division of Whiting Corporation 13

T

Taber Pump Co. 58
Tamms Industries Co. 104
Taylor Instrument Companies 136-137
Technical Sales Corporation 44
Thayer Scale Corp., The 14
Thermo Electric Co., Inc. 113
Tolhurst Centrifugals Division, American Machine and Metals, Inc. 203
Tote System, Inc. 156
Towmotor Corporation 157
Trent, Inc. 226
Trimount Instrument Company 17
Tube Turns Plastics, Inc., An Affiliate of Chemetron Corporation 205

U

Uehling Instrument Co. 54
Uhrden, Inc., Dumper Division 153
U. S. Electrical Motors Inc. 220
U. S. Flexible Tubing Co. 220
U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation 86A-B
U. S. Stoneware, Plastics & Synthetics Division 92
United States Gasket Company, Plastics Division of Garlock 177
United States Gauge, Division of American Machine and Metals, Inc. 118

V

Vanton Pump and Equipment Corp., Division of Cooper Alloy Corp. 24
Viking Pump Company 183
Vogt Machine Co., Henry 154
Vulcan Containers Inc. 65

W

Wall Colmonoy Corporation 54
Warco Laboratories 226
Warrick Co., Charles F. 228
Washington Steel Corporation 62
West Instrument Corporation 124
Western Precipitation Corporation 209
Whiting Corporation, Swenson Evaporator Company Division 13
Wiegand Company, Edwin L. 120-121
Wilmot Castle Company 21

Y

Yarnall-Waring Company 115
Yeomans 211
Young Brothers Co. 229

Advertising Representatives

NATHANIEL BECK, JR. — *Vice President*

BUFFALO 15, 1931 Kensington Avenue, Windsor 7765, Raymond C. Clifford

CHICAGO 11, 111 East Delaware Place, WHitehall 4-6141, Charles P. Gilkison, Jr., George W. McFedries, Edward W. Stone, Vincent F. Donohue

CLEVELAND 9, 5414 Archmere Avenue, SHadyside 1-9452, Ernest S. Holzworth

LOS ANGELES 57, Granada Building, 672 So. Lafayette Park Place, DUnkirk 8-2286, Bob Wettstein & Associates, Bob Wettstein, Walter P. Greenwood

NEW ENGLAND, East Shore Rd., Jamestown, R. I., Ph. Jamestown 38, Kenneth S. Kaull

NEW YORK 17, 369 Lexington Avenue, Murray Hill 6-7738, Kenneth S. Kaull, Norman A. Schuele, Jr., Robert Newberry, Henry C. Ruppel, Robert A. Norton

PHILADELPHIA, 611 Topsfield Road, Hatboro, Pa., OSborne 5-5193, William J. McCaw

PORTLAND 5, 337 Pittock Block, 921 S.W. Washington Street, CApitol 8-4107, Bob Wettstein & Associates

SAN FRANCISCO 8, 355 Stockton Street, YUkon 2-9537, Bob Wettstein & Associates, Jerry Nowell, Gene R. Watts

ST. LOUIS, 515 Newport Avenue, Webster Groves, Mo., WOodland 2-4384, Donald F. Maguire

SOUTHEASTERN STATES, 40 Peachtree Place, N.W., Atlanta 9, Ga., TRinity 2-2235, Joe H. Howell

as protective as a catcher's mask!

Protection against product discoloration... chemical changes... corrosive action

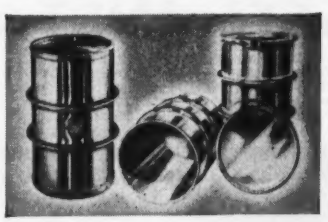
Is container neutrality of prime importance in shipping or storing your products? *Hackney Alloy Metal Drums* offer a proved solution.

Hackney Stainless Steel Drums are widely used to ship and store nitric acid, phosphoric acid, acetic acid, solvents formaldehyde, inks, food concentrates and many other products.

Hackney Nickel and Monel Metal Drums are frequently used to transport and store products such as phosphorous trichloride and other chemicals required for shipment in ICC-5K nickel drums. Monel drums are used primarily for shipment of liquid bromine.

Hackney Metal Drums are available with plain sides or I-bar rolling hoops; welded chimes; smooth bottoms with substantial foot rings; crack- and crevice-free, easy-to-clean interiors.

Stainless steel drums, with removable heads, come in 30- and 55-gallon capacities; drums with tight heads, 55-gallon capacities. For specifications of stainless, nickel and Monel drums, write:



Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 South 66th Street, Milwaukee 14, Wisconsin

Branch offices in principal cities

Hackney

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

Check 1500 opposite last page

MAGLINER MOBILE LOADING RAMPS

"Before installing our Magliner Mobile Loading Ramp," reports Mr. Leonard Wood, Plant Manager, Witco Chemical Co., "It took 16 to 18 manhours to unload a railcar from ground-level, and four manhours to unload a truck. Three men were required to handle each job. *Now, one man and power truck handle a truck shipment in fifteen minutes . . . a railcar shipment in four hours.* We figure our Magliner Loading Ramp paid for itself in six months, besides giving us extra safety for men, loads and equipment, and reducing our lift truck maintenance."

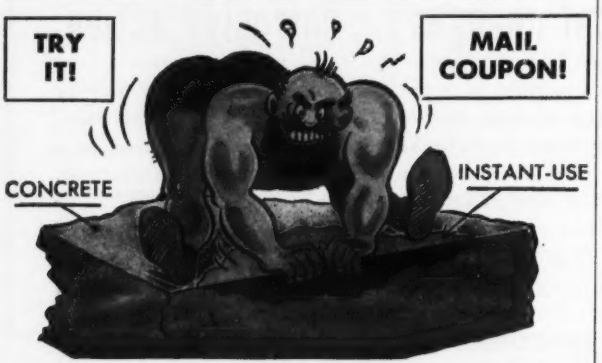
ASK ABOUT THE MAGLINER PROOF POSITIVE PLAN—See a Magliner mobile loading ramp at work, cutting costs right in your own operation.

Now Available! NEW NON-SLIP GRATING SURFACES FOR SAFE, SURE TRACTION IN ANY WEATHER
Another Magliner Exclusive!

MagLiner MAGNESIUM MOBILE LOADING RAMP

Write for Bulletin DB-211. Magline Inc., P.O. Box 439, Pinconning, Mich.

Check 1501 opposite last page



THIS TOUGH CONCRETE PATCH SETS INSTANTLY!

Repair broken factory floors without the usual traffic tie-up. Simply shovel INSTANT-USE into hole or rut—tamp smooth—truck over! No waiting! INSTANT-USE bonds tight to old concrete . . . right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment.

MAIL COUPON for TRIAL OFFER and FREE BROCHURE

INSTANT-USE

FLEXROCK COMPANY (Offices in principal cities)
3611 Filbert St., Philadelphia 1, Pa.

Please send me complete INSTANT-USE information, details of TRIAL ORDER PLAN and Free INSTANT-USE BROCHURE—no obligation. (Clip and attach Coupon to Co. letterhead).

Name.....
Title.....
Company.....
Address.....

Check 1502 opposite last page

Modern Instrumentation

From page 230

sonnel into design jobs. Assign process engineers to plant duties. Make design men responsible for construction supervision."

Quickest Way?

If it is reasonable for an operating man to have a greater interest in proper plant construction because he later will answer for its manufacturing costs, the quickest way to insure the necessary cooperation may be to assign an operating man as project manager.

That the problem is not always the same is exemplified by the response of Ohrberg of M. W. Kellogg Company, design and construction engineers:

"An engineering construction firm, of necessity, must have a high degree of coordination and cooperation among all its groups in order to exist in a highly-competitive market.

"In our organization (Kellogg) all the responsible groups except for customer and equipment suppliers are normally functions over which we have direct control.

"Coordination of a project in itself presents many difficulties but in our organization it has to be coordinated with many projects in varying stages of completion. This requires we maintain full-time groups specializing in scheduling and an expediting function to provide the necessary planning, administration, and reporting.

"Cooperation is a human relation or morale factor which must be continuously maintained by an organization's management personnel. It cannot be forced, but must be given willingly by the individual. First-line supervision must be constantly creating the correct mental attitudes within the group.

"However, the situation is helped by the fact that the engineer working on a new process finds the job a challenge. This engenders an added sense of accomplishment that stimulates the desire to cooperate and coordinate within all the groups responsible for the project."

Superb Performers

AURORA APCO Turbine-Type AURORA Always PUMPS AURORA Centrifugal

for EVERY LIQUIDS HANDLING JOB in INDUSTRY

The engineer-favor accorded "PUMPS by Aurora" rests squarely upon performance satisfaction. Why not let Aurora precision and quality serve your requirements, too?

ASK for CONDENSED CATALOG M-10

AURORA APCO *Turbine-Type* PUMPS

are available in SINGLE STAGE • TWO STAGE • FOUR STAGE • WATER JACKETED • STAINLESS STEEL or SPECIAL METALS for "1001" DUTIES.

AURORA *Centrifugal* PUMPS

are available in SINGLE and TWO STAGE HORIZONTALLY SPLIT CASE • SIDE SUCTION • VERTICAL • NON CLOG • SUMP • MIXED FLOW • SPECIAL DESIGN ETC.

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY
62 LOUCKS STREET • AURORA • ILLINOIS
EXPORT DEPARTMENT — Aurora, Illinois — Cable Address "NYABINT"

Check 1503 opposite last page

DEPENDABLE
100% AUTOMATIC
REMOTE READING
Tank Contents Gauges

- RELIABLE
- NO POWER REQUIRED
- UNDERWRITERS' APPROVED

Liquidometers use a temperature compensated balanced hydraulic system. Indications unaffected by changes in specific gravity. All models feature large easy-to-read dials. UL approved switches available.

Write for complete details to Dept. D.

Since 1920 ...of proven quality

THE LIQUIDOMETER CORP.
LONG ISLAND CITY 1, NEW YORK

Check 1504 opposite last page

If you want more information on processes, materials, controls, or other developments discussed herein, as you read this issue, ask our READER SERVICE DEPARTMENT . . . use this sheet

READER SERVICE SLIP
An Editorial Service — No Obligation

As you read editorial articles and advertisements which interest you, on which you'd like more information, note key number under each. Check that number in space provided on this sheet. Fill in your name, title, company, main product, and address on reverse side and mail to publisher's Reader Service Dept. Information will come to you direct, without obligation.

IMPORTANT: If you check a number having an asterisk (*) after it, be sure to follow special instructions at bottom of this page.

SEPTEMBER 1958

☐ 1000	☐ 1052*	☐ 1104	☐ 1157	☐ 1212	☐ 1264
☐ 1001	☐ 1053	☐ 1105	☐ 1158	☐ 1213	☐ 1265
☐ 1002	☐ 1054	☐ 1106	☐ 1159	☐ 1214	☐ 1266
☐ 1003	☐ 1055	☐ 1107	☐ 1160	☐ 1215	☐ 1267
☐ 1004	☐ 1056*	☐ 1108	☐ 1161	☐ 1216	☐ 1268
☐ 1005	☐ 1057	☐ 1109	☐ 1162*	☐ 1217	☐ 1269
☐ 1006	☐ 1058	☐ 1110	☐ 1163	☐ 1218	☐ 1270
☐ 1007	☐ 1059	☐ 1111	☐ 1164	☐ 1219	☐ 1271
☐ 1008*	☐ 1060*	☐ 1112	☐ 1165	☐ 1220	☐ 1272
☐ 1009	☐ 1061	☐ 1113	☐ 1166	☐ 1221	☐ 1273
☐ 1010*	☐ 1062	☐ 1114	☐ 1167	☐ 1222	☐ 1274
☐ 1011	☐ 1063	☐ 1115*	☐ 1168	☐ 1223	☐ 1275
☐ 1012	☐ 1064	☐ 1116	☐ 1169	☐ 1224	☐ 1276
☐ 1013	☐ 1065	☐ 1117	☐ 1170	☐ 1225	☐ 1277
☐ 1014	☐ 1066*	☐ 1118	☐ 1171	☐ 1226	☐ 1278
☐ 1015	☐ 1067	☐ 1119*	☐ 1172	☐ 1227	☐ 1279
☐ 1015A	☐ 1068	☐ 1120*	☐ 1173	☐ 1228	☐ 1280*
☐ 1016	☐ 1069*	☐ 1121	☐ 1174	☐ 1229	☐ 1281
☐ 1017	☐ 1070	☐ 1122	☐ 1176	☐ 1230	☐ 1282
☐ 1018	☐ 1071	☐ 1123	☐ 1177	☐ 1231	☐ 1283
☐ 1019	☐ 1072	☐ 1124	☐ 1178	☐ 1232	☐ 1284
☐ 1020	☐ 1073	☐ 1125	☐ 1179	☐ 1233	☐ 1285
☐ 1021	☐ 1074	☐ 1126	☐ 1180	☐ 1234	☐ 1286
☐ 1022	☐ 1075	☐ 1127*	☐ 1181*	☐ 1235	☐ 1287
☐ 1023	☐ WI - 4	☐ 1128*	☐ 1182	☐ 1236	☐ 1288
☐ 1024	☐ 1076*	☐ 1129*	☐ 1183	☐ 1237	☐ 1289*
☐ 1025	☐ 1077	☐ 1130	☐ 1184	☐ 1238	☐ 1290
☐ 1026	☐ 1078	☐ 1131*	☐ 1185	☐ 1239	☐ 1291
☐ 1027	☐ 1079	☐ 1132	☐ 1186	☐ 1240	☐ 1292
☐ 1028	☐ 1080*	☐ 1133	☐ 1188*	☐ 1241	☐ 1293
☐ 1029	☐ 1081	☐ 1134	☐ 1189*	☐ 1242	☐ 1294
☐ 1030	☐ 1082	☐ 1135	☐ 1190	☐ 1243	☐ 1295
☐ 1031	☐ 1083	☐ 1136*	☐ 1191	☐ 1244	☐ 1296
☐ 1032	☐ 1084	☐ 1137	☐ 1192	☐ 1245	☐ 1297
☐ 1033	☐ 1085	☐ 1138	☐ 1193	☐ 1246	☐ 1298
☐ 1034	☐ 1086	☐ 1139	☐ 1194	☐ 1247	☐ 1299
☐ 1035	☐ 1087	☐ 1140	☐ 1195	☐ 1248	☐ 1300
☐ 1036	☐ 1088	☐ 1141	☐ 1196	☐ 1249	☐ 1301
☐ 1037	☐ 1089	☐ 1142	☐ 1197*	☐ 1250	☐ 1302
☐ 1038	☐ 1090	☐ 1143	☐ 1198	☐ 1251	☐ 1303
☐ 1039	☐ 1091	☐ 1144	☐ 1199	☐ 1252	☐ 1304
☐ 1040	☐ 1092	☐ 1145	☐ 1200	☐ 1253	☐ 1305
☐ 1041	☐ 1093	☐ 1146	☐ 1201	☐ 1253A*	☐ 1306
☐ 1042	☐ 1094	☐ 1147	☐ 1202	☐ 1254	☐ 1307
☐ 1043	☐ 1095	☐ 1148	☐ 1203*	☐ 1255	☐ 1308
☐ 1044	☐ 1096	☐ 1149	☐ 1204	☐ 1256	☐ 1309
☐ 1045	☐ 1097	☐ 1150	☐ 1205	☐ 1257	☐ 1310
☐ 1046	☐ 1098	☐ 1151	☐ 1206	☐ 1258	☐ 1311
☐ 1047	☐ 1099	☐ 1152	☐ 1207*	☐ 1259	☐ 1312
☐ 1048	☐ 1100	☐ 1153	☐ 1208	☐ 1260	☐ 1313
☐ 1049	☐ 1101	☐ 1154	☐ 1209	☐ 1261	☐ 1314
☐ 1050	☐ 1102	☐ 1155	☐ 1210	☐ 1262	☐ 1315
☐ 1051	☐ 1103	☐ 1156	☐ 1211	☐ 1263	

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Key No.	Description

READER SERVICE SLIP Continued from reverse side of this sheet **SEPTEMBER 1958**

☐ 1316	☐ 1348	☐ 1380	☐ 1412	☐ 1444	☐ 1476
☐ 1317	☐ 1349	☐ 1381	☐ 1413	☐ 1445	☐ 1477
☐ 1318	☐ 1350	☐ 1382	☐ 1414	☐ 1446	☐ 1478
☐ 1319	☐ 1351	☐ 1383	☐ 1415	☐ 1447	☐ 1479
☐ 1320	☐ 1352	☐ 1384	☐ 1416	☐ 1448	☐ 1480
☐ 1321	☐ 1353	☐ 1385	☐ 1417	☐ 1449	☐ 1481
☐ 1322	☐ 1354	☐ 1386	☐ 1418	☐ 1450	☐ 1482
☐ 1323	☐ 1355	☐ 1387	☐ 1419*	☐ 1451	☐ 1483
☐ 1324	☐ 1356	☐ 1388	☐ 1420	☐ 1452	☐ 1484
☐ 1325*	☐ 1357	☐ 1389	☐ 1421	☐ 1453	☐ 1485
☐ 1326	☐ 1358	☐ 1390*	☐ 1422	☐ 1454	☐ 1486
☐ 1327	☐ 1359	☐ 1391	☐ 1423	☐ 1455	☐ 1487
☐ 1328	☐ 1360	☐ 1392	☐ 1424	☐ 1456	☐ 1488
☐ 1329	☐ 1361	☐ 1393	☐ 1425	☐ 1457	☐ 1489
☐ 1330	☐ 1362	☐ 1394	☐ 1426	☐ 1458	☐ 1490
☐ 1331	☐ 1363	☐ 1395	☐ 1427	☐ 1459	☐ 1491
☐ 1332	☐ 1364	☐ 1396	☐ 1428	☐ 1460	☐ 1492
☐ 1333	☐ 1365	☐ 1397	☐ 1429	☐ 1461	☐ 1493
☐ 1334	☐ 1366	☐ 1398	☐ 1430	☐ 1462	☐ 1494
☐ 1335	☐ 1367	☐ 1399	☐ 1431	☐ 1463	☐ 1495
☐ 1336	☐ 1368	☐ 1400	☐ 1432	☐ 1464	☐ 1496
☐ 1337	☐ 1369*	☐ 1401	☐ 1433	☐ 1465	☐ 1497
☐ 1338	☐ 1370	☐ 1402	☐ 1434	☐ 1466	☐ 1498
☐ 1339	☐ 1371	☐ 1403	☐ 1435	☐ 1467	☐ 1499*
☐ 1340	☐ 1372*	☐ 1404	☐ 1436	☐ 1468	☐ 1500
☐ 1341	☐ 1373	☐ 1405	☐ 1437	☐ 1469	☐ 1501
☐ 1342	☐ 1374	☐ 1406	☐ 1438	☐ 1470	☐ 1502
☐ 1343	☐ 1375	☐ 1407	☐ 1439	☐ 1471	☐ 1503
☐ 1344	☐ 1376	☐ 1408	☐ 1440	☐ 1472	☐ 1504
☐ 1345	☐ 1377	☐ 1409	☐ 1441	☐ 1473	☐ 1505
☐ 1346	☐ 1378	☐ 1410	☐ 1442	☐ 1474	☐ 1506
☐ 1347*	☐ 1379	☐ 1411	☐ 1443	☐ 1475	

*On all numbers having an asterisk (*) after them, please identify the exact product or piece of literature in one of the blank columns on this and front page. Write in the key number, as given on the slip, followed by the bulletin number (or title), or name of product in which you are interested.

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Key No.	Description

Be Sure To Give Your Address

Please type or print and be sure to give your title and main product of company

Name ..... **Title** .....

Company ..... **Main Product** .....

Street Address of Company .....

City ..... **Zone No.** ..... **State** .....

This is an Editorial Service — No Obligation

Fill in . . . mail to READER SERVICE DEPT., CHEMICAL PROCESSING
111 East Delaware Place, Chicago 11, Illinois

Special subscription request-qualification form for use of **SEPTEMBER 1958**

Management and technical men who wish to receive CHEMICAL PROCESSING regularly – request below . . . if you qualify, there is no charge

If you are responsible for processing operations, in a management or technical capacity, as corporate officer, manager, technical purchasing agent, chemical engineer, chemist, engineer, or equivalent responsibility . . . in a plant of substantial operations* where chemical processing is an important factor . . . CHEMICAL PROCESSING will be sent to you regularly, at your request — there is no charge.

Present Reader . . . if this issue of CHEMICAL PROCESSING was addressed to you or if you have previously mailed one of these request slips, it is not necessary to fill in this form.

New Reader . . . if you qualify as outlined above CHEMICAL PROCESSING will be sent to you regularly. There is no charge to those who qualify. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employes. Unless all information is given, magazine will not be sent.

Please print or type

Name _____ Title _____

Company _____

Main Products _____

Rating of Company _____

Street Address of Company _____

City _____ Zone No. _____ State _____

*"substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

Others In Your Plant . . . if others in your plant, having responsibilities for processing operations as outlined above, would also like to receive CHEMICAL PROCESSING, use the form on back of this sheet.

Change of Address . . . Use this form to notify us of a change in address. Please answer all questions in regard to your new affiliation, and in addition give us your former address including company, city, and state.

Please print or type

Former Company Affiliation _____

Former Address _____

Your Name _____ Present Title _____

Present Company _____

Main Products _____

Rating of Company _____

Street Address of Company _____

City _____ Zone No. _____ State _____

Just mail this request to
READER SERVICE DEPT., CHEMICAL PROCESSING
111 East Delaware Place, Chicago 11, Illinois

See other side of this sheet

WOULD OTHERS IN YOUR PLANT also like to receive CHEMICAL PROCESSING without charge?

If others in your plant also would like to receive CHEMICAL PROCESSING . . . and if they qualify as outlined on the reverse side of this sheet . . . list their names below. Then mail this slip to READER SERVICE DEPT., CHEMICAL PROCESSING, 111 East Delaware Place, Chicago 11, Illinois.

Please print or type

Name ..... Title .....

Name ..... Title .....

Name ..... Title .....

Name ..... Title .....

Company .....

Main Products .....

Rating of Company .....

Street Address of Company .....

City ..... Zone No. ..... State .....

IF YOU ALSO WOULD LIKE

to receive CHEMICAL PROCESSING personally

see reverse side of this sheet. There is no charge if you qualify.

See other side of this sheet

THAT'S INTERESTING

Mushroom boom

Commercial Solvents Corp. has come up with a tasty switch at its Terre Haute, Ind. plant. It has converted the shut-down penicillin plant to growing mushrooms. Newly developed method grows mushrooms to full commercial size in vats of pure aerated nutrient fluid. Process, which takes just 72 hrs, is similar to penicillin manufacture. Stemless, full bodied morsels can be cooked, dried, powdered, canned, and frozen without loss of flavor or vitamin content. Total annual US consumption could be produced in matter of two weeks.

Charges up at −100°F

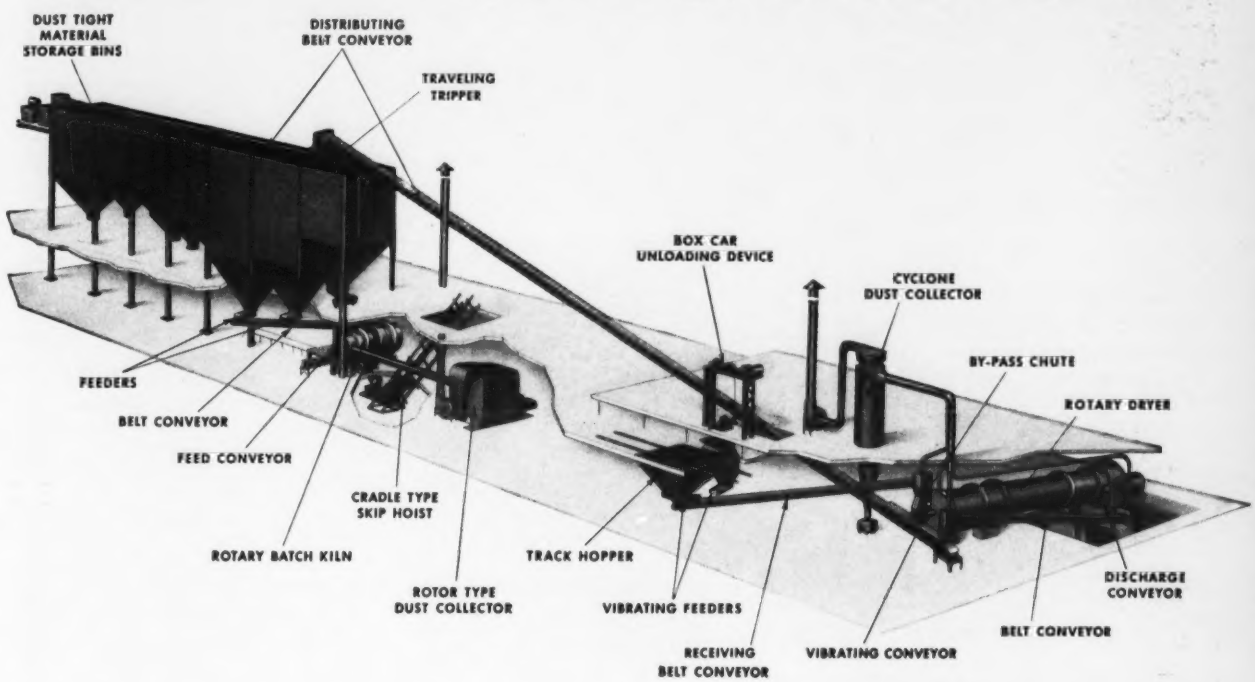
New primary battery operates at −100°F. Besides ability to operate over temperature range of 200 to −100°F, battery offers high terminal potential approximating 2.30 volts at −100°F.

For more information on product at right, specify 1505 see information request blank opposite last page.

BARTLETT-SNOW
CLEVELAND 5, OHIO

DRYERS · COOLERS CALCINERS · KILNS

Individual units or complete systems including all materials handling; processing and storage facilities



MATERIALS PROCESSING, HANDLING AND STORAGE SYSTEM

Seven materials, each having different lump size, moisture content, and angle of repose; are handled and stored with this one system. After passing across the receiving belt, materials of proper dryness are transferred directly onto the distributing belt, and discharged with a belt tripper, into the proper compartment in the covered storage bin. Material received too wet is first passed through the direct fired rotary dryer, before being stored. One material containing chemically combined water is treated in a rotary batch kiln that discharges into a specially designed skip hoist. The entire system is completely interlocked and operated from one central control panel.

● Let the Bartlett-Snow heat processing engineers work with you on your next plant modernization, plant enlargement or new plant project. Widely experienced in drying, calcining and other heat processing of — chemical salts, mineral oxides, ores, carbon black, sludges and precipitates, fertilizers, food products, antibiotics and a wide variety of other materials, — without contamination, spoilage or dust loss. Any desired capacity. Continuous or batch operation. Mild steel, stainless or alloy construction.

Our extensive research laboratory can provide needed physical and chemical data, — and even produce actual samples of the treated product, before the full plant equipment is built.

We can supply all the facilities for an entire system, assuring earlier completion of the project and fully synchronized operation according to plan. Get full details from the Bartlett-Snow heat processing engineers. *You'll find it pays!*

—— *Write for* **BULLETIN No. 118** *Today.* ——

Material Handling and Processing Division

THE C. O. BARTLETT & SNOW CO.

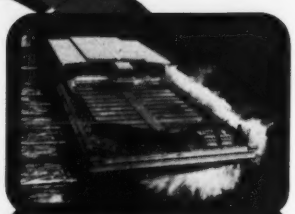
6150 HARVARD AVENUE • CLEVELAND 5, OHIO

NEW YORK • CHICAGO • DETROIT • BUFFALO • PHILADELPHIA

The new corrosion film everyone is talking about!

LIFETIME PROTECTION FOR STEEL

Here is an authoritative film that answers many questions on the theory of corrosion and demonstrates methods by which it is controlled. Presented in color and sound, it ranges from the formation of anodes and cathodes through the use of galvanizing, inhibitors, metallizing, cathodic protection, alloys and protective coatings. You will see how many corrosion problems in industries such as yours are being solved by Dimetcote, a one-coat zinc silicate protective coating. This film will be well worth 19 minutes of your time. To arrange a showing for you and your associates, or to learn when it will be shown in your area, contact any of the Amercoat offices listed below.



Typical audience reactions:

Bishop, Tex.—"Planning fair-sized test after seeing this film."

Louisville, Ky.—"Answers many questions. Second showing arranged."

Cincinnati, Ohio—"Key personnel evidenced considerable interest."

Netherlands Antilles—"Both shows led to 45-minute discussions."

Fairport, Ohio—"Very interesting. Will try methods shown."

Las Piedras, Venezuela—"Putting ideas to work in near future."

Bartlesville, Okla.—"Viewed by 42 key men from five divisions."

Answers these and other questions:

What produces electrolytic corrosion?

What factors favor hot-dip galvanizing?

How important is surface preparation?

Can a coating survive a tank fire?

Can rust in tankers be controlled?

Can a coating offer cathodic protection?

What are the corrosion problems on offshore rigs?

What are the advantages of zinc silicate?

How can chemical plants cut painting costs?

Amercoat® CORPORATION

Dept. PI • 4809 Firestone Boulevard
South Gate, California

- 921 Pitner Avenue • Evanston, Illinois
- 2404 Dennis Street • Jacksonville, Florida
- 360 Carnegie Avenue • Kenilworth, New Jersey
- 6530 Supply Row • Houston, Texas

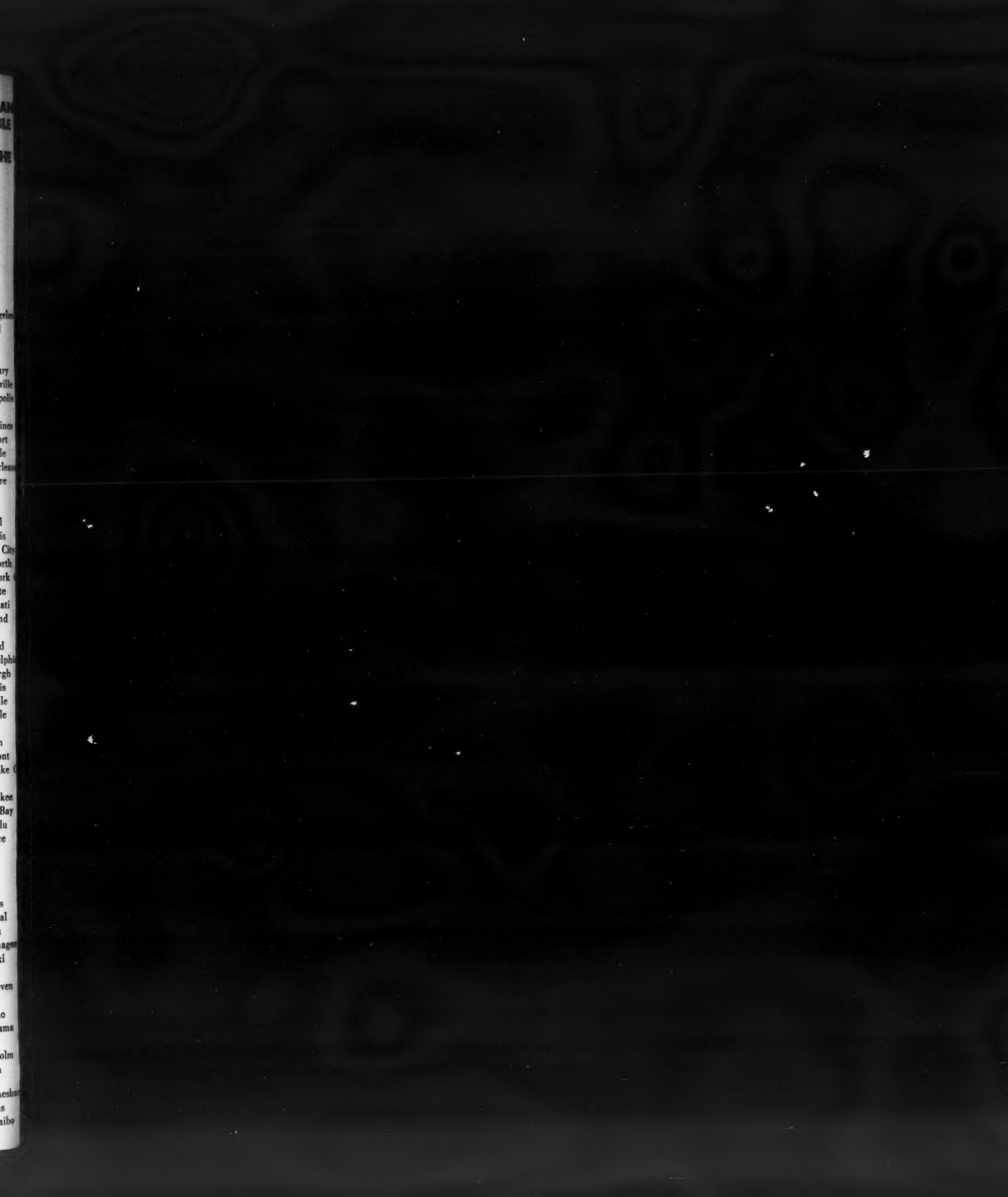
113

Check 1506 opposite last page

AMERCOAT PRODUCTS AND SERVICES ARE AVAILABLE IN ALL MAJOR CITIES. IN EVERY SECTION OF THE UNITED STATES AND CANADA, AND MANY COUNTRIES IN EUROPE AND SOUTH AMERICA:

UNITED STATES:

ALABAMA	Mobile
ARIZONA	Phoenix
CALIFORNIA	Los Angeles
	Oakland
	Fresno
COLORADO	Denver
CONNECTICUT	Waterbury
FLORIDA	Jacksonville
INDIANA	Indianapolis
ILLINOIS	Chicago
IOWA	Des Moines
	Davenport
KENTUCKY	Louisville
LOUISIANA	New Orleans
MARYLAND	Baltimore
MASSACHUSETTS	Boston
MICHIGAN	Detroit
MINNESOTA	St. Paul
MISSOURI	St. Louis
	Kansas City
NEW JERSEY	Kenilworth
NEW YORK	New York
NORTH CAROLINA	Charlotte
OHIO	Cincinnati
	Cleveland
OKLAHOMA	Tulsa
OREGON	Portland
PENNSYLVANIA	Philadelphia
	Pittsburgh
TENNESSEE	Memphis
	Knoxville
	Nashville
TEXAS	Dallas
	Houston
	Beaumont
UTAH	Salt Lake City
WASHINGTON	Seattle
WISCONSIN	Milwaukee
	Green Bay
HAWAII	Honolulu
PUERTO RICO	Santurce

FOREIGN:

BELGIUM	Brussels
CANADA	Montreal
CUBA	Havana
DENMARK	Copenhagen
FINLAND	Helsinki
FRANCE	Paris
HOLLAND	Eindhoven
ITALY	Milan
	Palermo
JAPAN	Yokohama
LUXEMBOURG	
SWEDEN	Stockholm
SWITZERLAND	Geneva
UNION OF SOUTH AFRICA	Johannesburg
VENEZUELA	Caracas
	Maracaibo